

TABLE 8003.6-C – STORAGE OF CLASS 1 OXIDIZER LIQUIDS AND SOLIDS IN COMBUSTIBLE CONTAINERS¹

CONDITION	LIMITS (feet)	
	× 304.8 for mm	
Piles		
Maximum length	No limit	
Maximum width	50	
Maximum height	20	
Minimum distance to next pile	3	
Minimum distance to walls	2	
Maximum quantity per building	No limit	

¹Storage in noncombustible containers or in bulk in detached storage buildings is not limited as to quantity or arrangement.

TABLE 8003.6-D—STORAGE OF CLASS 2 OXIDIZER LIQUIDS AND SOLIDS^{1,2,3}

CONDITION	LIMITS		
	× 304.8 for mm		
	× 0.907 185 for metric ton		
	Segregated	Cut Off	Detached
Piles			
Maximum height (feet)	10	12	12
Minimum distance to next pile (feet)	Footnote 2	Footnote 2	Footnote 2
Minimum distance to walls (feet)	2	2	2
Maximum quantity per pile (tons)	20	50	200
Maximum quantity per building (tons)	200	500	No limit

¹Storage in noncombustible containers is not limited as to quantity or arrangement, except that piles shall be at least 2 feet (609.6 mm) from walls in sprinklered buildings and 4 feet (1219 mm) from walls in nonsprinklered buildings; the distance between piles shall not be less than the pile height.

²Aisle width shall not be less than the pile height.

³Quantity limits shall be reduced by 50 percent in buildings or portions of buildings used for retail sales.

TABLE 8003.6-E—STORAGE OF CLASS 3 OXIDIZER LIQUIDS AND SOLIDS^{1,2}

CONDITION	LIMITS		
	× 304.8 for mm		
	× 0.4536 for kg		
	Segregated	Cut Off	Detached
Piles			
Maximum height (feet)	8	10	10
Minimum distance to next pile (feet)	Footnote 3	Footnote 3	Footnote 3
Minimum distance to walls (feet)	4	4	4
Maximum quantity per pile (tons)	20	30	150
Maximum quantity per building (tons)	100	300	No limit

¹Except in buildings used for retail sales, quantity limits per pile and per building are allowed to be doubled where Class 3 oxidizers are in noncombustible containers.

²Quantity limits per pile and per building shall be reduced by 50 percent in buildings or portions of buildings used for retail sales.

³Aisle width shall not be less than the pile height.

TABLE 8003.6-F—STORAGE OF CLASS 4 OXIDIZER LIQUIDS AND SOLIDS

CONDITION	LIMIT (feet)
	× 304.8 for mm
Piles	
Maximum length	10
Maximum width	4
Maximum height	8
Minimum distance to next pile	8
Maximum quantity per building	No limit

TABLE 8003.6-G—OXIDIZING GASES—DISTANCE FROM USE TO EXPOSURES¹

QUANTITY OF GAS STORED (cubic feet at NTP)	DISTANCE TO A BUILDING OR PUBLIC WAY OR PROPERTY LINE THAT CAN BE BUILT ON (feet)	DISTANCE BETWEEN STORAGE AREAS (feet)
		× 304.8 for mm
0–50,000	5	5
50,001–100,000	10	10
100,001 or greater	15	10

¹The distances do not apply when protective structures having a minimum fire resistance of two hours interrupt the line of sight between the storage container and the exposure. The protective structure shall be at least 5 feet (1524 mm) from the exposure. The configuration of the protective structure shall allow natural ventilation to prevent the accumulation of hazardous gas concentrations.

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8003.7 Organic Peroxides.

8003.7.1 Indoor Storage.

8003.7.1.1 General. Indoor storage of organic peroxides in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.7.1.

Detonatable organic peroxides that are capable of detonation in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Article 77 as required for high explosives.

8003.7.1.2 Detached Storage. Storage of organic peroxides shall be in detached buildings in accordance with Section 8003.1.15 when required by Section 8003.1.15.

8003.7.1.3 Distance from Detached Storage Buildings to Exposures. In addition to the requirements of the Building Code, detached storage buildings shall be located in accordance with Tables 8003.7-A and 8003.7-B.

8003.7.1.4 Liquid-tight Floor. In addition to Section 8003.1.13, floors of storage areas shall be of liquid-tight construction.

8003.7.1.5 Smoke and Heat Venting. Smoke and heat venting shall be provided. The design criteria shall be as set forth in the Building Code.

8003.7.1.6 Electrical Wiring and Equipment. In addition to Section 8001.11.4, electrical wiring and equipment in storage areas for Class I or II organic peroxides shall comply with the requirements for electrical Class I, Division 2 locations.

8003.7.1.7 Smoke Detection. An approved supervised smoke-detection system shall be provided in rooms or areas where Class I, II, III or IV organic peroxides are stored. Activation of the detection system shall sound a local alarm.

EXCEPTION: A smoke-detection system need not be provided in detached storage buildings protected by an automatic fire-extinguishing system.

8003.7.1.8 Storage Conditions.

8003.7.1.8.1 Maximum Quantities. Maximum quantity per building in a mixed-occupancy building shall not exceed the amounts set forth in Table 8003.1-B. Maximum quantity per building in a detached storage building shall not exceed the amounts specified in Tables 8003.7-A and 8003.7-B.

8003.7.1.8.2 Storage Arrangement. Storage arrangement for organic peroxides shall be in accordance with Tables 8003.7-C through 8003.7-E and shall comply with all of the following:

1. Containers and packages in storage areas shall be closed,
2. Bulk storage shall not be in piles or bins,
3. A minimum 2-foot (609.6 mm) clear space shall be maintained between storage and uninsulated metal walls, and
4. Fifty-five-gallon (208.2 L) drums shall not be stored more than one drum high.

8003.7.1.8.3 Location in Building. The storage of Classes I and II organic peroxides shall be on the ground floor. Class III organic peroxides shall not be stored in basements.

8003.7.1.9 Contamination. Organic peroxides shall be stored in their original DOT shipping containers. During storage, care shall be taken to prevent contamination.

8003.7.2 Outdoor Storage.

8003.7.2.1 General. Outdoor storage of organic peroxides in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.7.2.

EXCEPTION: Detonatable organic peroxides that are capable of detonation in their normal shipping containers under fire conditions shall be stored in accordance with Article 77 as required for high explosives.

8003.7.2.2 Distance from Storage to Exposures. Storage areas for organic peroxides shall be located in accordance with Tables 8003.7-A and 8003.7-B.

8003.7.2.3 Electrical Wiring and Equipment. In addition to Section 8001.11.4, electrical wiring and equipment in outdoor storage areas containing Class I, II or III organic peroxides shall comply with the requirements for electrical Class I, Division 2 locations.

8003.7.2.4 Storage Conditions.

8003.7.2.4.1 Maximum Quantities. Maximum quantities of organic peroxides shall be in accordance with Tables 8003.7-A and 8003.7-B.

8003.7.2.4.2 Storage Arrangement. Storage arrangement shall be in accordance with Tables 8003.7-C, 8003.7-D and 8003.7-E.

8003.7.2.5 Separation. In addition to Section 8001.11.8, storage areas for organic peroxides exceeding the amounts specified in Table 8003.1-B shall be located a minimum distance of 50 feet (15 240 mm) from other hazardous material storage.

TABLE 8003.7-A—SEPARATION OF DETACHED AND OUTDOOR STORAGE FROM OTHER BUILDINGS, PROPERTY LINES, STREETS, ALLEYS, PUBLIC WAYS OR MEANS OF EGRESS TO A PUBLIC WAY

ORGANIC PEROXIDE CLASS ¹	MAXIMUM STORAGE QUANTITY (pounds) AT MINIMUM SEPARATION × 0.4536 for kg		
	50 Feet (15 240 mm)	100 Feet (30 480 mm)	150 Feet (45 720 mm)
	I	2,000	20,000
II	100,000	200,000	No limit
III	200,000	No limit	No limit

¹Classes IV and V, no requirement.

TABLE 8003.7-B—SEPARATION BETWEEN INDIVIDUAL DETACHED STORAGE BUILDINGS OR AREAS

ORGANIC PEROXIDE CLASS ¹	MAXIMUM STORAGE QUANTITY (pounds) AT MINIMUM SEPARATION		
	× 0.4536 for kg		
	20 Feet (6096 mm)	75 Feet (22 860 mm)	100 Feet (30 480 mm)
I	2,000	20,000	175,000
II and III	Footnote 2		

¹Class IV and V, no requirement.

²When the amount of organic peroxide stored does not exceed the amount indicated in Table 8003.7-A, minimum separation shall be 20 feet (6096 mm). When the amount of organic peroxide stored exceeds the amount indicated in Table 8003.7-A, minimum separation shall be 50 feet (15 240 mm).

TABLE 8003.7-C—STORAGE OF CLASS I ORGANIC PEROXIDES

CONDITION	LIMITS (feet)
	× 304.8 for mm
Piles	
Maximum width	6
Maximum height	8
Minimum distance to next pile	4 ¹
Minimum distance to walls	4 ²
Maximum quantity per building	Footnote 3

¹At least one main aisle with a minimum width of 8 feet (2438.4 mm) shall divide the storage area.

²Distance to noncombustible walls is allowed to be reduced to 2 feet (609.6 mm).

³See Section 8003.1.15 and Tables 8003.7-A and 8003.7-B for maximum quantities.

TABLE 8003.7-D—STORAGE OF CLASS II AND III ORGANIC PEROXIDES

CONDITION	LIMITS (feet)
	× 304.8 for mm
Piles	
Maximum width	10
Maximum height	8
Minimum distance to next pile	4 ¹
Minimum distance to walls	4 ²
Maximum quantity per building	Footnote 3

¹At least one main aisle with a minimum width of 8 feet (2438.4 mm) shall divide the storage area.

²Distance to noncombustible walls is allowed to be reduced to 2 feet (609.6 mm).

³See Section 8003.1.15 and Tables 8003.7-A and 8003.7-B for maximum quantities.

TABLE 8003.7-E—STORAGE OF CLASS IV ORGANIC PEROXIDES

CONDITION	LIMITS (feet)
	× 304.8 for mm
Piles	
Maximum width	16
Maximum height	10
Minimum distance to next pile	3 ^{1,2}
Minimum distance to walls	4

¹At least one main aisle with a minimum width of 8 feet (2438.4 mm) shall divide the storage area.

²Distance shall not be less than one-half the pile height.

TABLE 8003.8-A – PYROPHORIC GASES—DISTANCE FROM STORAGE TO EXPOSURES¹

MAXIMUM AMOUNT PER STORAGE AREA (cubic feet)	MINIMUM DISTANCE BETWEEN STORAGE AREAS (feet)	MINIMUM DISTANCE TO PROPERTY LINES THAT CAN BE BUILT UPON (feet)	MINIMUM DISTANCE TO STREETS, ALLEYS OR PUBLIC WAYS (feet)	MINIMUM DISTANCE TO BUILDINGS ON THE SAME PROPERTY		
				Nonrated or Openings within 25 feet (7620 mm)	Two-hour and No Openings within 25 feet (7620 mm)	Four-hour and No Openings within 25 feet (7620 mm)
				× 304.8 for mm		
× 3.785 for L						
250	5	25	5	5	0	0
2,500	10	50	10	10	5	0
7,500	20	100	20	20	10	0

¹The distances can be reduced to 5 feet (1524 mm) when protective structures having a minimum fire resistance of two hours interrupt the line of sight between the container and the exposure. The protective structure shall be at least 5 feet (1524 mm) from the exposure. The configuration of the protective structure shall allow natural ventilation to prevent the accumulation of hazardous gas concentrations.

8003.8 Pyrophoric Materials.**8003.8.1 Indoor storage.**

8003.8.1.1 General. Indoor storage of pyrophoric solids, liquids and gases in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.8.1. See also Section 8001.16.4.

Indoor storage of silane and mixtures of silane 2 percent or more by volume shall be in accordance with Section 9002, UFC Standard 80-1.

8003.8.1.2 Liquid-tight Floor. In addition to Section 8003.1.13, floors of storage areas containing pyrophoric liquids shall be of liquid-tight construction.

8003.8.1.3 Storage Conditions.

8003.8.1.3.1 Pyrophoric Solids and Liquids. Storage of pyrophoric liquids and solids shall be limited to a maximum area of 100 square feet (9.29 m²) per pile. Storage shall not exceed 5 feet (1524 mm) in height. Individual containers shall not be stacked.

Aisles between storage piles shall be a minimum of 10 feet (3048 mm) in width.

Individual tanks or containers shall not exceed 500 gallons (1893 L) capacity.

8003.8.1.3.2 Pyrophoric Gases. Storage of pyrophoric gases shall be in detached buildings in accordance with Section 8003.1.15 when required by Section 8003.1.15.

8003.8.1.4 Separation. In addition to Section 8001.11.8, indoor storage of pyrophoric solids, liquids and gases shall be isolated from incompatible hazardous materials by one-hour fire-resistive walls with openings protected in accordance with the Building Code.

EXCEPTION: Storage in approved hazardous materials storage cabinets constructed in accordance with Section 8001.10.6.

8003.8.2 Outdoor Storage.

8003.8.2.1 General. Outdoor storage of pyrophoric solids, liquids and gases in quantities exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.8.2.

Outdoor storage of silane and mixtures of silane 2 percent or more by volume shall be in accordance with UFC Standard 80-1.

8003.8.2.2 Distance from Storage to Exposures. The separation of pyrophoric solids, liquids and gases from buildings, property lines, streets, alleys, public ways or means of egress to a public way shall be in accordance with the following:

1. **Solids and Liquids.** Twice the separation required by Article 79 for Class I-B flammable liquids.

2. **Gases.** The location and maximum amount of pyrophoric gas per storage area shall be in accordance with Table 8003.8-A.

8003.8.2.3 Storage Conditions. Quantities, arrangement and spacing for pyrophoric liquids and solids in tanks, portable tanks and containers shall be in accordance with Article 79 as required for Class I-B flammable liquids.

8003.8.2.4 Separation of incompatible materials. In addition to Section 8001.11.8, separation of pyrophoric liquids and solids from other hazardous materials shall be in accordance with Article 79 as required for Class I-B flammable liquids.

8003.9 Unstable (Reactive) Materials.**8003.9.1 Indoor storage.**

8003.9.1.1 General. General. Indoor storage of unstable (reactive) materials in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.9.1.

In addition, Class 3 and 4 unstable (reactive) detonatable materials shall be stored in accordance with the Building Code requirements for explosives.

Storage and display of Class 2 and 3 unstable (reactive) materials in Group M Occupancies shall be in accordance with Section 8001.14.

Storage of Class 2 and 3 unstable (reactive) materials in Group S Occupancies is allowed to be in accordance with Section 8001.14.

8003.9.1.2 Detached Storage. Storage of unstable (reactive) materials shall be in detached buildings in accordance with Section 8003.1.15 when required by Section 8003.1.15.

8003.9.1.3 Liquid-tight Floor. In addition to Section 8003.1.13, floors of storage areas for liquids and solids shall be of liquid-tight construction.

8003.9.1.4 Smoke and Heat Venting. Smoke and heat venting shall be provided. The design criteria shall be as set forth in the Building Code.

8003.9.1.5 Storage Conditions. Unstable (reactive) materials stored in quantities greater than 500 cubic feet (14.16 m³) shall be separated into piles, each not larger than 500 cubic feet (14.16 m³). Aisle width shall not be less than the height of the piles or 4 feet (1219 mm), whichever is greater.

EXCEPTION: Materials stored in tanks.

Unstable (reactive) materials shall not be stored in basements.

8003.9.2 Outdoor Storage.

8003.9.2.1 General. Outdoor storage of unstable (reactive) materials in quantities exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.9.2.

8003.9.2.2 Distance from Storage to Exposures. Outdoor storage of unstable (reactive) material which can deflagrate shall not be within 75 feet (22 860 mm) of buildings, property lines, streets, alleys, public ways or means of egress to a public way.

Outdoor storage of nondeflagrating unstable (reactive) materials shall not be within 20 feet (6096 mm) of buildings, property lines, streets, alleys, public ways or means of egress to a public way. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the sides of the storage is allowed in lieu of such distance.

8003.9.2.3 Storage Conditions. Piles of unstable (reactive) materials shall not exceed 1,000 cubic feet (28.3 m³).

Aisle widths between piles shall not be less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

8003.10 Water-reactive Solids and Liquids.

8003.10.1 Indoor Storage.

8003.10.1.1 General. Indoor storage of water-reactive solids and liquids in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.10.1.

Storage and display of water-reactive materials in Group M Occupancies shall be in accordance with Section 8001.14.

Storage of Class 2 and 3 water-reactive materials in Group S Occupancies is allowed to be in accordance with Section 8001.14.

8003.10.1.2 Detached Storage. Storage of water-reactive materials shall be in detached buildings in accordance with Section 8003.1.15 when required by Section 8003.1.15.

8003.10.1.3 Liquid-tight Floor. In addition to Section 8003.1.13, floors of storage areas shall be of liquid-tight construction.

8003.10.1.4 Waterproof Room. Rooms or areas used for the storage of water-reactive solids or liquids shall be constructed in a manner which resists the penetration of water through the use of waterproof materials. Piping carrying water for other than approved automatic fire-sprinkler systems shall not be within such rooms or areas.

8003.10.1.5 Smoke and Heat Venting. Smoke and heat venting shall be provided. The design criteria shall be as set forth in the Building Code.

8003.10.1.6 Fire-extinguishing Systems. When Class 3 solids or liquids are stored in areas protected by an automatic fire-sprinkler system, the materials shall be stored in closed watertight containers.

8003.10.1.7 Storage Conditions. Water-reactive solids and liquids stored in quantities greater than 500 cubic feet (14.16 m³) shall be separated into piles, each not larger than 500 cubic feet (14.16 m³). Aisle widths between piles shall not be less than the height of the pile or 4 feet (1219 mm), whichever is greater.

EXCEPTION: Water-reactive solids and liquids stored in tanks.

Class 2 water-reactive solids and liquids shall not be stored in basements unless such materials are stored in closed watertight containers or tanks.

Class 3 water-reactive solids and liquids shall not be stored in basements.

For storage with flammable liquids, see Section 7902.5.4.

8003.10.2 Outdoor Storage.

8003.10.2.1 General. Outdoor storage of water-reactive solids and liquids shall be within tanks or closed watertight containers, and in quantities exceeding the exempt amounts set forth in Section 8001.15, shall be in accordance with Sections 8003.1 and 8003.10.2.

8003.10.2.2 Distance from Storage to Exposures. Outdoor storage of Class 3 water-reactive solids and liquids shall not be

within 75 feet (22 860 mm) of buildings, property lines, streets, alleys, public ways or means of egress to a public way.

Outdoor storage of Class 1 and 2 water-reactive solids and liquids shall not be within 20 feet (6096 mm) of buildings, property lines, streets, alleys, public ways or means of egress to a public way. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the sides of the storage area is allowed in lieu of such distance.

8003.10.2.3 Storage Conditions. Class 3 water-reactive solids and liquids shall be limited to piles not greater than 100 cubic feet (2.83 m³).

Class 1 or 2 water-reactive solids and liquids shall be limited to piles not greater than 1,000 cubic feet (28.3 m³).

Aisle widths between piles shall not be less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

8003.11 Cryogenic Fluids. Storage of cryogenic fluids shall be in accordance with Article 75. For requirements pertaining to oxidizing cryogenic fluids, see Section 9002, UFC Standard 80-2. For requirements pertaining to flammable cryogenic fluids, see UFC Standard 80-3. For requirements pertaining to inert cryogenic fluids, see Section 9002, UFC Standard 80-4.

8003.12 Highly Toxic and Toxic Solids and Liquids.

8003.12.1 Indoor Storage.

8003.12.1.1 General. Indoor storage of highly toxic and toxic solids and liquids in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.12.1.

Storage and display of highly toxic or toxic materials in Group M Occupancies shall be in accordance with Section 8001.14.

Storage of highly toxic or toxic materials in Group S Occupancies is allowed to be in accordance with Section 8001.14.

8003.12.1.2 Liquid-tight Floors. In addition to Section 8003.1.13, floors of storage rooms shall be of liquid-tight construction.

8003.12.1.3 Exhaust Scrubber. Exhaust scrubbers or other systems for the processing of highly toxic liquid vapors shall be provided for storage areas where a spill or other accidental release of such liquids can be expected to release highly toxic vapors. Exhaust scrubbers and other processing systems shall be installed in accordance with the Mechanical Code. Emission control shall conform to the requirements of the local air quality authority.

8003.12.1.4 Separation. In addition to Section 8001.11.8, storage of highly toxic liquids and solids shall be isolated from other hazardous materials by one-hour fire-resistive construction or stored in approved hazardous material storage cabinets. See Section 8001.10.6.

8003.12.2 Outdoor Storage.

8003.12.2.1 General. Outdoor storage of highly toxic and toxic solids and liquids in quantities exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.12.2.

8003.12.2.2 Distance from Storage to Exposures. Outdoor storage of highly toxic or toxic solids and liquids shall not be within 20 feet (6096 mm) of buildings, property lines, streets, alleys, public ways or means of egress to a public way. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the sides of the storage area is allowed in lieu of such distance.

8003.12.2.3 Fire-extinguishing Systems. Outdoor storage of highly toxic solids and liquids shall be in fire-resistive containers or shall comply with one of the following:

1. The storage area shall be protected by an automatic, open head, deluge fire-sprinkler system of the type and density specified in the Fire Code (see Section 9003, Standard n.2.9), or

2. Storage shall be located under a canopy of noncombustible construction, with the canopied area protected by an automatic fire-sprinkler system of the type and density specified in the Fire Code. See Section 9003, Standard n.2.9. Such storage shall not be considered indoor storage. See Section 8003.1.14.

8003.12.2.4 Storage Conditions. Outdoor storage piles of highly toxic solids and liquids shall be separated into piles, each not larger than 2,500 cubic feet (70.79 m³). Aisle widths between piles shall not be less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

The storage of highly toxic liquids which liberate highly toxic vapors in the event of a spill or other accidental discharge shall not be outside of a building unless effective collection and treatment systems are provided. The treatment system shall comply with the Mechanical Code.

8003.13 Radioactive Materials.

8003.13.1 Indoor Storage.

8003.13.1.1 General. Indoor storage of radioactive materials in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.13.1.

8003.13.1.2 Liquid-tight Floor. In addition to Section 8003.1.13, floors of storage areas shall be of liquid-tight construction.

8003.13.1.3 Detection. Areas used for the storage of radioactive materials shall be provided with detection equipment suitable for determining surface level contamination at levels that would present a short-term hazard condition. Such detection equipment is allowed to be maintained at a location other than the storage area but shall be on the premises.

8003.13.1.4 Storage Conditions. The maximum quantity and storage arrangement of radioactive materials to be stored in buildings or rooms designed for such purposes shall be in accordance with the requirements of the Nuclear Regulatory Commission and state and local requirements.

Storage of contaminated combustible materials shall be in tightly closed noncombustible containers which do not contain other waste. Special attention shall be given to prompt disposal of combustible wastes contaminated with oxidizing materials that are subject to spontaneous heating.

8003.13.1.5 Container Quantity Limits. The quantity of material in any individual container shall not exceed 2 millicuries (7.4 10⁷ becquerels) for alpha emitters, 200 curies

(7.4 10¹² becquerels) for beta emitters or 0.1 curies (3.7 10⁹ becquerels) for gamma emitters.

EXCEPTION: Licensed, sealed sources for instruments, calibration devices and equipment. Licensing requirements and determination of whether a source is sealed or nonsealed shall be as set forth in Nuclear Regulatory Commission regulations.

8003.13.2 Outdoor Storage.

8003.13.2.1 General. Outdoor storage of radioactive materials in quantities exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.13.2.

8003.13.2.2 Distance from Storage to Exposures. Outdoor storage shall not be within 20 feet (6096 mm) of property lines, streets, alleys, public ways or means of egress to a public way. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the sides of the storage area is allowed in lieu of such distance.

Outdoor storage shall not be within 20 feet (6096 mm) of buildings unless the building exterior walls are not less than one-hour fire-resistive construction. Storage shall not be within 10 feet (3048 mm) from building openings. Building openings less than 20 feet (6096 mm) from outdoor storage shall be protected by a fire assembly having a 45-minute fire-resistive rating.

8003.13.2.3 Fire-extinguishing Systems. Outdoor storage of radioactive materials shall be in fire-resistive containers or shall comply with one of the following:

1. The storage area shall be protected by an automatic, open head, deluge fire-sprinkler system of the type and density specified in the Fire Code (see Section 9002, Standard 10-3), or

2. Storage shall be located under a canopy of noncombustible construction, with the canopied area protected by an approved automatic fire-extinguishing system. Such storage shall not be considered to be indoor storage. See Section 8003.1.14.

8003.13.2.4 Storage Conditions. Storage shall be arranged in accordance with Nuclear Regulatory Commission, state and local requirements.

8003.14 Corrosives.

8003.14.1 Indoor Storage.

8003.14.1.1 General. Indoor storage of corrosive materials in amounts exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.14.1.

EXCEPTION: For stationary lead-acid battery systems used for standby power, emergency power or uninterrupted power supplies, see Article 64.

Storage and display of corrosive materials in Group M Occupancies shall be in accordance with Section 8001.14.

Storage of corrosive materials in Group S Occupancies is allowed to be in accordance with Section 8001.14.

8003.14.1.2 Liquid-tight Floor. In addition to Section 8003.1.13, floors in storage areas for corrosive liquids shall be of liquid-tight construction.

8003.14.2 Outdoor Storage.

8003.14.2.1 General. Outdoor storage of corrosive materials in quantities exceeding the exempt amounts set forth in Section

8001.15 shall be in accordance with Sections 8003.1 and 8003.14.2.

8003.14.2.2 Distance from Storage to Exposures. Outdoor storage of corrosive materials shall not be within 20 feet (6096 mm) of property lines, streets, alleys, public way, or buildings not used exclusively for storage, distribution, or manufacturing of gases. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the side of the storage area is allowed in lieu of such distance.

8003.15 Irritants, Sensitizers and Other Health Hazard Solids, Liquids and Gases.

8003.15.1 Indoor Storage. There are no requirements for indoor storage or display of irritants, sensitizers and other health hazard solids, liquids and gases.

8003.15.2 Outdoor Storage.

8003.15.2.1 General. Outdoor storage of irritants, sensitizers and other health hazard solids, liquids and gases in quantities exceeding the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8003.1 and 8003.15.2.

8003.15.2.2 Distance from Storage to Exposures. Outdoor storage of irritants, sensitizers or other health hazard solids, liquids and gases shall not be within 20 feet (6096 mm) of buildings, property lines, streets, alleys, public ways or exits to a public way. An unpierced two-hour fire-resistive wall extending not less than 30 inches (762 mm) above and to the sides of the storage area is allowed in lieu of such distance.

8003.15.2.3 Storage Conditions. Outdoor storage of carcinogens, irritants, sensitizers and other health hazard solids and liquids shall be separated into piles not larger than 2,500 cubic feet (70.79 m³). Aisle widths between piles shall not be less than one-half the height of the piles or 10 feet (3048 mm), whichever is greater.

SECTION 8004 — USE, DISPENSING AND HANDLING

8004.1 General.

8004.1.1 Applicability. Use, dispensing and handling of hazardous materials where the aggregate quantity is in excess of the exempt amounts set forth in Section 8001.15 shall be in accordance with Sections 8001 and 8004.

EXCEPTIONS: 1. For stationary lead-acid battery systems used for standby power, emergency power or uninterrupted power supply, see Article 64.

2. Application of pesticide products registered with the United States Environmental Protection Agency.

Use, dispensing and handling of hazardous materials where the aggregate quantity does not exceed the exempt amounts set forth in Section 8001.15 shall be in accordance with Section 8001. For flammable, oxidizing and pyrophoric gases, see also Section 8001.16.

For requirements pertaining to oxidizing cryogenic fluids, see UFC Standard 80-2. For requirements pertaining to flammable cryogenic fluids, see Section 9002, UFC Standard 80-3. For requirements pertaining to inert cryogenic fluids, see Section 9002, UFC Standard 80-4.

8004.1.2 Separation from Storage of Hazardous Materials. See Section 8001.11.8.

8004.1.3 Noncombustible Floor. Except for surfacing, floors of areas where liquid or solid hazardous materials are dispensed or used in open systems shall be of noncombustible, liquid-tight construction.

8004.1.4 Spill Control and Secondary Containment for Hazardous Materials Liquids. When required by other provisions of Section 8004, spill control and secondary containment shall be provided for hazardous materials liquids in accordance with Section 8003.1.3.

8004.1.5 Limit Controls.

8004.1.5.1 General. Limit controls shall be provided in accordance with Section 8004.1.5.

8004.1.5.2 Liquid Level.

8004.1.5.2.1 High Level. Open tanks in which hazardous materials are used shall be equipped with a liquid level limit control or other means to prevent overfilling of the tank.

8004.1.5.2.2 Low Level. Open tanks and containers in which hazardous materials are heated shall be equipped with approved automatic shutoff controls which will sense low liquid levels and shut off the source of heat.

8004.1.5.3 Temperature. Process tanks and equipment which involve temperature control of the material shall be provided with limit controls to maintain the temperature within a safe range.

8004.1.5.4 Pressure. Stationary tanks and equipment containing materials which can generate pressures exceeding the tank or equipment design limits due to exposure fires or internal reaction shall be equipped with pressure-limiting or relief devices. Relief devices for stationary tanks or equipment for highly toxic, toxic or corrosive materials shall vent to an exhaust scrubber or treatment system for processing of vapors or gases. See Section 8003.3.1.3.5. Relief devices for flammable or explosive vapors or gases shall vent to an approved location.

8004.1.6 Standby and Emergency Power. When mechanical ventilation, treatment systems, temperature control, manual alarm, detection or other electrically operated systems are required by other provisions of Section 8004, such systems shall be connected to a standby source of power to automatically supply electrical power in the event of loss of power from the primary source. These systems shall be installed, maintained and tested in accordance with Section 1113.

When highly toxic or toxic compressed gases or highly toxic liquids are used or dispensed, emergency power shall be provided in lieu of standby power on all required systems. These systems shall be installed, maintained and tested in accordance with Section 1113.

8004.1.7 Supervision. Manual alarm, detection, and automatic fire-extinguishing systems required by other provisions of Section 8004 shall be supervised by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location.

8004.1.8 Signs. Signs prohibiting smoking shall be provided in dispensing and open-use areas and within 25 feet (7620 mm) of outdoor dispensing or open-use areas.

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8004.1.9 Lighting. Adequate lighting by natural or artificial means shall be provided. Artificial lighting shall be in accordance with nationally recognized standards. See Article 90, Standard i.1.1.

8004.1.10 Fire-extinguishing Systems. Indoor rooms or areas in which hazardous materials are dispensed or used shall be protected by an automatic fire-extinguishing system. Sprinkler system design shall not be less than that required by the Fire Code for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (278.7 m²). See Section 9002, Standard 10-3. Where the materials or storage arrangement require a higher level of sprinkler system protection in accordance with nationally recognized standards, the higher level of sprinkler system protection shall be provided.

EXCEPTION: Approved alternate automatic fire-extinguishing systems are allowed.

8004.1.11 Ventilation. Indoor dispensing and use areas shall be provided with exhaust ventilation in accordance with Section 8003.1.4.

EXCEPTION: Ventilation is not required for dispensing and use of flammable solids other than finely divided particles.

8004.1.12 Emergency Shutoff for Flammable, Oxidizing and Pyrophoric Gases. Flammable, oxidizing and pyrophoric gas systems shall be provided with approved emergency shutoff valves that can be activated at each point of use and at each source.

8004.1.13 Container Position for Liquefied Flammable Gases and Flammable Gases in Solution. Containers of liquefied flammable gases and flammable gases in solution shall be in the upright position or positioned such that the pressure-relief valve is in direct contact with the vapor phase of the container.

8004.1.14 Bulk Oxygen Systems. Bulk oxygen systems at industrial and institutional consumer sites shall be in accordance with UFC Standard 80-2.

8004.1.15 Liquid Transfer. Liquids having a hazard ranking of 3 or 4 in accordance with UFC Standard 79-3 shall be transferred by one of the following methods:

EXCEPTIONS: 1. Liquids having a hazard ranking of 4 when dispensed from approved containers not exceeding 1.1 gallons (4 L).

2. Liquids having a hazard ranking of 3 when dispensed from approved containers not exceeding 5.3 gallons (20 L).

1. From safety cans.
2. Through an approved closed-piping system.
3. From containers or tanks by an approved pump taking suction through an opening in the top of the container or tank.
4. From containers or tanks by gravity through an approved self- or automatic-closing valve when the container or tank and dispensing operations are provided with spill control and secondary containment. See Section 8003.1.3.

EXCEPTION: Highly toxic liquids shall not be dispensed by gravity from tanks.

5. Approved engineered liquid transfer systems.

8004.1.16 Silane. Use and dispensing of silane and mixtures of silane greater than 2 percent by volume shall be in accordance with Section 8004 and Section 9002, UFC Standard 80-1.

8004.2 Indoor Dispensing and Use.

8004.2.1 General. Indoor dispensing and use of hazardous materials shall be in buildings complying with the Building Code and in accordance with Sections 8004.1 and 8004.2.

8004.2.2 Open systems.

8004.2.2.1 General. Dispensing and use of hazardous materials in open containers or systems shall be in accordance with Section 8004.2.2.

8004.2.2.2 Ventilation. When gases, liquids or solids having a hazard ranking of 3 or 4 in accordance with UFC Standard 79-3 are dispensed or used, mechanical exhaust ventilation shall be provided to capture fumes, mists or vapors at the point of generation.

EXCEPTION: Gases, liquids or solids which can be demonstrated not to create harmful fumes, mists or vapors.

8004.2.2.3 Fire-extinguishing System. In addition to Section 8004.1.10, laboratory fume hoods and spray booths where flammable materials are dispensed or used shall be protected by an automatic fire-extinguishing system.

8004.2.2.4 Explosion Control. Explosion control shall be provided in accordance with Section 8003.1.7 when an explosive environment can occur because of the characteristics or nature of the hazardous materials dispensed or used, or as a result of the dispensing or use process.

8004.2.2.5 Spill Control and Secondary Containment for Hazardous Materials Liquids.

8004.2.2.5.1 Spill Control for Hazardous Materials Liquids. Buildings, rooms or areas where hazardous materials liquids are dispensed into vessels exceeding a 1.1 gallon (4 L) capacity or used in open systems exceeding a 5.3 gallon (20 L) capacity shall be provided with spill control in accordance with Section 8003.1.3.2.

8004.2.2.5.2 Secondary Containment for Hazardous Materials Liquids. When required by Table 8004.2-A, buildings, rooms or areas where hazardous materials liquids are dispensed or used in open systems shall be provided with secondary containment in accordance with Section 8003.1.3.3 when the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

Individual Vessel or System: Greater than 1.1 gallons (4 L)

Multiple Vessels or Systems: Greater than 5.3 gallons (20 L)

8004.2.3 Closed Systems.

8004.2.3.1 General. Use of hazardous materials in closed containers or systems shall be in accordance with Section 8004.2.3.

8004.2.3.2 Use. Systems shall be suitable for the use intended and shall be designed by persons competent in such design. Where nationally recognized good practices or standards have been established for the processes employed, they shall be followed in the design. Controls shall be designed to prevent materials from entering or leaving process or reaction systems at other than the intended time, rate or path. When automatic controls are provided, they shall be designed to be fail safe.

8004.2.3.3 Ventilation. If closed systems are designed to be opened as part of normal operations, ventilation shall be provided in accordance with Section 8004.2.2.2.

8004.2.3.4 Fire-extinguishing System. In addition to Section 8004.1.10, laboratory fume hoods and spray booths where flammable materials are used shall be protected by an automatic fire-extinguishing system.

8004.2.3.5 Explosion Control. Explosion control shall be provided in accordance with Section 8003.1.7 when an explosive environment can occur because of the hazardous materials dispensed or used, or as a result of the dispensing or use process.

EXCEPTION: When process vessels are designed to fully contain the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

8004.2.3.6 Spill Control and Secondary Containment for Hazardous Materials Liquids.

8004.2.3.6.1 Spill Control for Hazardous Materials Liquids. Buildings, rooms or areas where hazardous materials liquids are used in individual vessels exceeding a 55 gallon (208.2 L) capacity shall be provided with spill control in accordance with Section 8003.1.3.2.

8004.2.3.6.2 Secondary Containment for Hazardous Materials Liquids. When required by Table 8004.2-A, buildings, rooms or areas where hazardous materials liquids are used in vessels or systems shall be provided with secondary containment in accordance with Section 8003.1.3.3 when the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

Individual Vessel or System: Greater than 55 gallons
(208.2 L)

Multiple Vessels or Systems: Greater than 1,000 gallons
(3785 L)

8004.2.3.7 Special Requirements for Highly Toxic and Toxic Compressed Gases.

8004.2.3.7.1 Ventilation and Storage Arrangement. Compressed gas cylinders shall be within gas cabinets, exhausted enclosures or gas rooms. Portable or stationary tanks shall be within gas rooms or exhausted enclosures.

8004.2.3.7.2 Gas Cabinets. Gas cabinets shall be in accordance with Section 8003.3.1.3.2. Gas cabinets shall be internally sprinklered.

8004.2.3.7.3 Exhausted Enclosures. Exhausted enclosures shall be in accordance with Section 8003.3.1.3.3. Exhausted enclosures shall be internally sprinklered.

8004.2.3.7.4 Gas Rooms. Gas rooms shall be in accordance with Sections 8003.3.1.3.4 and 8003.3.1.3.5. Gas rooms shall be internally sprinklered.

8004.2.3.7.5 Treatment Systems. Treatment systems shall be provided in accordance with Section 8003.3.1.3.5.

8004.2.3.7.6 Gas Detection. Gas detection shall be provided in accordance with Section 8003.3.1.6. Activation of the monitoring system shall automatically close the shutoff valve on highly toxic or toxic gas supply lines related to the system being monitored.

EXCEPTION: Automatic shutdown need not be provided for reactors utilized for the production of toxic or highly toxic gases when such reactors are:

1. Operated at pressures less than 15 psig (103.4 kPa),

2. Constantly attended, and

3. Provided with readily accessible emergency shutoff valves.

8004.2.3.7.7 Smoke Detection. Smoke detection shall be provided in accordance with Section 8003.3.1.7.

8004.2.3.7.8 Maximum Number of Cylinders Per Gas Cabinet. The number of cylinders contained in a single gas cabinet shall not exceed three.

8004.2.3.7.9 Process Equipment. Effluent from process equipment containing highly toxic or toxic gases which could be discharged to the atmosphere shall be processed through an exhaust scrubber or other processing system. Such systems shall be in accordance with the Mechanical Code as required for product-conveying ventilation systems.

8004.3 Outdoor Dispensing and Use.

8004.3.1 General.

8004.3.1.1 Quantities Exceeding Exempt Amounts. Outdoor dispensing or use of hazardous materials in both closed or open containers or systems where the aggregate quantity is in excess of the exempt amounts in Tables 8001.15-C and 8001.15-D shall be in accordance with Sections 8004.1 and 8004.3.

EXCEPTION: Application of pesticide products registered with the United States Environmental Protection Agency.

8004.3.1.2 Quantities Not Exceeding Exempt Amounts. Outdoor dispensing or use of hazardous materials where the aggregate quantity does not exceed the exempt amounts specified in Tables 8001.15-C and 8001.15-D are not required to be in accordance with Section 8004 except as provided in Section 8004.3.

8004.3.2 Location. Outdoor dispensing and use areas for hazardous materials shall be located as required for outdoor storage in accordance with Section 8003.

8004.3.3 Spill Control and Secondary Containment for Hazardous Materials Liquids.

8004.3.3.1 Open Systems.

8004.3.3.1.1 Spill Control for Hazardous Materials Liquids. Outdoor areas where hazardous materials liquids are dispensed in vessels exceeding a 1.1 gallon (4 L) capacity or used in open systems exceeding a 5.3 gallon (20 L) capacity shall be provided with spill control in accordance with Section 8003.1.3.2.

8004.3.3.1.2 Secondary Containment for Hazardous Materials Liquids. When required by Table 8004.2-A, outdoor areas where hazardous materials liquids are dispensed or used in open systems shall be provided with secondary containment in accordance with Section 8003.1.3.3 when the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

Individual Vessel or System: Greater than 1.1 gallons (4 L)

Multiple Vessels or Systems: Greater than 5.3 gallons (20 L)

8004.3.3.2 Closed Systems.

8004.3.3.2.1 Spill Control for Hazardous Materials Liquids. Outdoor areas where hazardous materials liquids are used in closed systems exceeding 55 gallons (208.2 L) shall be provided with spill control in accordance with Section 8003.1.3.2.

8004.3.3.2 Secondary Containment for Hazardous Materials Liquids. When required by Table 8004.2-A, outdoor areas where hazardous materials liquids are dispensed or used in closed systems shall be provided with secondary containment in accordance with Section 8003.1.3.3 when the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

Individual Vessel or System: Greater than 55 gallons
(208.2 L)

Multiple Vessels or Systems: Greater than 1,000 gallons
(3785 L)

8004.3.4 Clearance from Combustibles. The area surrounding an outdoor dispensing or use area shall be kept clear of combustible materials and vegetation for a minimum distance of 30 feet (9144 mm).

8004.3.5 Special Requirements for Toxic and Highly Toxic Compressed Gases.

8004.3.5.1 Ventilation and Arrangement. When cylinders, containers or portable tanks are used outdoors, gas cabinets or exhausted enclosures shall be provided.

8004.3.5.2 Gas Cabinets. Gas cabinets shall be in accordance with Section 8003.3.1.3.2.

8004.3.5.3 Exhausted Enclosures. Exhausted enclosures shall be in accordance with Section 8003.3.1.3.3.

8004.3.5.4 Treatment Systems. Treatment systems shall be provided in accordance with Section 8003.3.1.3.5.

8004.3.5.5 Gas Detection. Gas detection shall be provided in gas cabinets and exhausted enclosures in accordance with Section 8003.3.1.6. Activation of the monitoring system shall automatically close the shutoff valve on highly toxic or toxic gas supply lines related to the system being monitored.

EXCEPTION: Automatic shutdown need not be provided for reactors utilized for the production of toxic or highly toxic gases when such reactors are:

1. Operated at pressures less than 15 psig (103.4 kPa),
2. Constantly attended, and
3. Provided with readily accessible emergency shutoff valves.

8004.3.5.6 Fire-extinguishing System. Gas cabinets and exhausted enclosures shall be internally sprinklered.

8004.3.6 Special Requirements for Flammable Gases. Flammable gases shall be located in accordance with Table 8003.5-A.

8004.3.7 Special Requirements for Oxidizer Gases. Oxidizer gases shall be located in accordance with Table 8003.6-G.

8004.3.8 Special Requirements for Pyrophoric Gases. Pyrophoric gases shall be located in accordance with Table 8003.8-A.

8004.4 Handling.

8004.4.1 General.

8004.4.1.1 Quantities Exceeding Exempt Amounts. Handling of hazardous materials in indoor and outdoor locations where the aggregate quantity is in excess of the exempt amounts in Tables 8001.15-A through 8001.15-D shall be in accordance with Sections 8004.1 and 8004.4.

8004.4.1.2 Quantities Not Exceeding Exempt Amounts. Handling of hazardous materials in indoor locations where the aggregate quantity does not exceed the exempt amount specified in Tables 8001.15-A and 8001.15-B shall be in accordance with Sections 8004.1 and 8004.4. Handling of hazardous materials in outdoor locations where the aggregate quantity does not exceed the exempt amount specified in Tables 8001.15-C and 8001.15-D is not required to be in accordance with Section 8004, except as provided in Section 8004.3.

8004.4.2 Location. Outdoor handling areas for hazardous materials shall be located as required for outdoor storage in accordance with Section 8003.

8004.4.3 Emergency Alarm. When hazardous materials having a hazard ranking of 3 or 4 in accordance with Section 9002, UFC Standard 79-3 are transported through corridors or exit enclosures, there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit-access doorway throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall also initiate a local audible alarm.

REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIALS SOLIDS AND LIQUIDS USE

MATERIAL	INDOOR USE		OUTDOOR USE	
	Solids	Liquids	Solids	Liquids
1. Physical Hazard Materials				
Combustible dusts	NR	NA	NR	NA
Combustible liquids	Class II	NA	See Article 79	See Article 79
	Class III-A	NA	See Article 79	See Article 79
	Class III-B	NA	See Article 79	See Article 79
Cryogenic liquids	NA	See Article 75	NA	See Article 75
Explosives	See Article 77		See Article 77	
Flammable liquids	Class I-A	NA	See Article 79	See Article 79
	Class I-B	NA	See Article 79	See Article 79
	Class I-C	NA	See Article 79	See Article 79
Flammable solids	NR	NA	NR	NA
Organic peroxides	Class D	NR	R	R
	Class I	NR	R	R
	Class II	NR	R	R
	Class III	NR	R	R
	Class IV	NR	R	R
	Class V	NR	NR	NR
Oxidizers	Class 4	NR	R	R
	Class 3	NR	R	R
	Class 2	NR	R	R
	Class 1	NR	R	R
Pyrophorics	NR	R	NR	R
Unstable (reactives)	Class 4	NR	R	R
	Class 3	NR	R	R
	Class 2	NR	R	R
	Class 1	NR	NR	R
Water reactives	Class 3	NR	R	R
	Class 2	NR	R	R
	Class 1	NR	NR	R
2. Health Hazard Materials				
Carcinogens	NR	R	NR	R
Corrosives	NR	R	NR	R
Highly toxics	NR	R	NR	R
Irritants	NR	NR	NR	R
Other health hazards	NR	NR	NR	R
Radioactives	NR	R	NR	R
Sensitizers	NR	NR	NR	R
Toxics	NR	R	NR	R

NA = Not Applicable
 NR = Not Required
 R = Required
 D = Detonatable

ARTICLE 81 — HIGH-PILED COMBUSTIBLE STORAGE

References in NFPA 230 1999 Edition.

SECTION 8101 — GENERAL

8101.1 Scope. Buildings containing high-piled combustible storage shall be in accordance with Article 81. In addition to the requirements of Article 81, aerosols shall be in accordance with Article 88, flammable and combustible liquids shall be in accordance with Article 79, and hazardous materials shall be in accordance with Article 80.

Storage of combustible paper records shall be in accordance with Article 81 and Section 9002, UFC Standard 81-4.

8101.2 Definitions.

8101.2.1 General. For definitions of AEROSOL; ARRAY; ARRAY, CLOSED; BINBOX; COMMODITY; CURTAIN BOARD; EARLY SUPPRESSION FAST-RESPONSE SPRINKLER; EXPANDED PLASTIC; EXTRAHIGH-RACK COMBUSTIBLE STORAGE; HIGH-PILED COMBUSTIBLE STORAGE; LONGITUDINAL FLUE SPACE; MANUAL STOCKING METHODS; MECHANICAL STOCKING METHODS; SHELF STORAGE; AND TRANSVERSE FLUE SPACE, see Article 2.

8101.2.2 Limited Application. For the purpose of Article 81, certain terms are defined as follows:

HIGH-PILED STORAGE AREA is an area within a building which is designated, intended, proposed or actually used for high-piled combustible storage.

SOLID SHELVING is shelving that is solid, slatted, mesh, or grated located within racks that obstructs sprinkler water penetration through the racks.

8101.3 Permits and Plan Submittal.

8101.3.1 Permits. For a permit to use a building for high-piled combustible storage, see Section 105.

8101.3.2 Plans and Specifications Submittal. At the time of permit application, plans and specifications including the information specified in Section 8101.3.2 shall be submitted for review and approval. Following approval of the plans, a copy of the approved plans shall be maintained on the premises in an approved location. The plans shall include the following:

1. Floor plan of the building showing locations and dimensions of high-piled storage areas.
2. Useable storage height for each storage area.
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 8101.4.
8. Location of commodities which are banded or encapsulated.
9. Location of required fire department access doors.

10. Type of fire-suppression and fire-detection systems.

11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

12. Type, location and specifications of smoke-removal and curtain board systems.

13. Dimension and location of transverse and longitudinal flue spaces.

14. Additional information regarding required design features, commodities, storage arrangement and fire-protection features within the high-piled storage area shall be provided at the time of permit, when required by the chief.

8101.3.3 Evacuation Plan. When required by the chief, an evacuation plan for public accessible areas and a separate set of plans indicating location and width of aisles, location of exits and exit-access doors and exit signs, height of storage, and locations of hazardous materials shall be submitted at the time of permit application for review and approval. Following approval of the plans, a copy of the approved plans shall be maintained on the premises in an approved location.

8101.4 Commodity Classification.

8101.4.1 General.

8101.4.1.1 Classification of Commodities. Commodities shall be classified as Class I, II, III, IV or high hazard in accordance with Section 8101.4.1. Materials listed within each commodity classification are assumed to be unmodified for improved combustibility characteristics. Use of flame-retarding modifiers or the physical form of the material could change the classification. See Section 8101.4.2 for classification of Groups A, B and C plastics.

8101.4.1.2 Class I Commodities. Class I commodities are essentially noncombustible products on wooden or nonexpanded polyethylene solid deck pallets, in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without pallets. Class I commodities are allowed to contain a limited amount of Group A plastics in accordance with Section 8101.4.3. Examples of Class I commodities include, but are not limited to, the following:

- Alcoholic beverages not exceeding 20 percent alcohol
- Appliances—noncombustible, electrical
- Cement in bags
- Ceramics
- Dairy products in nonwax-coated containers (excluding bottles)
- Dry insecticides
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glycol in metal cans

Gypsum board
 Inert materials, bagged
 Insulation, noncombustible

Noncombustible liquids in plastic containers having less than a 5-gallon (18.9 L) capacity

Noncombustible metal products

8101.4.1.3 Class II Commodities. Class II commodities are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without pallets. Class II commodities are allowed to contain a limited amount of Group A plastics in accordance with Section 8101.4.3. Examples of Class II commodities include, but are not limited to, the following:

Alcoholic beverages not exceeding 20 percent alcohol, in combustible containers

Foods in combustible containers

Incandescent or fluorescent light bulbs in cartons

Thinly coated fine wire on reels or in cartons

8101.4.1.4 Class III Commodities. Class III commodities are commodities of wood, paper, natural fiber cloth, or Group C plastics or products thereof, with or without pallets. Products are allowed to contain limited amounts of Group A or B plastics, such as metal bicycles with plastic handles, pedals, seats and tires. Group A plastics shall be limited in accordance with Section 8101.4.3. Examples of Class III commodities include, but are not limited to, the following:

Aerosol, Level 1 (see Article 88)

Combustible fiberboard

Cork, baled

Feed, bagged

Fertilizers, bagged

Food in plastic containers

Furniture: wood, natural fiber, upholstered, nonplastic, wood or metal with plastic-padded and covered arm rests

Glycol in combustible containers not exceeding 25 percent

Lubricating or hydraulic fluid in metal cans

Lumber

Mattresses, excluding foamed rubber and foamed plastics

Noncombustible liquids in plastic containers having a capacity of more than 5 gallons (18.9 L)

Paints, oil base, in metal cans

Paper, waste, baled

Paper and pulp, horizontal storage, or vertical storage that is banded or protected with approved wrap

Paper in cardboard boxes

Pillows, excluding foamed rubber and foamed plastics

Plastic-coated paper food containers

Plywood

Rags, baled

Rugs, without foamed backing

Sugar, bagged

Wood, baled

Wood doors, frames and cabinets

Yarns of natural fiber and viscose

8101.4.1.5 Class IV Commodities. Class IV commodities are Class I, II or III products containing Group A plastics in ordinary corrugated cartons and Classes I, II and III products, with Group A plastic packaging, with or without pallets. Group B plastics and free-flowing Group A plastics are also included in this class. The total amount of nonfree-flowing Group A plastics shall be in accordance with Section 8101.4.3. Examples of Class IV commodities include, but are not limited to, the following:

Aerosol, Level 2 (see Article 88)

Alcoholic beverages, exceeding 20 percent but less than 80 percent alcohol, in cans or bottles in cartons

Clothing, synthetic or nonviscose

Combustible metal products (solid)

Furniture, plastic upholstered

Furniture, wood or metal with plastic covering and padding

Glycol in combustible containers (greater than 25 percent and less than 50 percent)

Linoleum products

Paints, oil base in combustible containers

Pharmaceutical, alcoholic elixirs, tonics, etc.

Rugs, foamed back

Shingles, asphalt

Thread or yarn, synthetic or nonviscose

8101.4.1.6 High-hazard Commodities. High-hazard commodities are high-hazard products presenting special fire hazards beyond those of Class I, II, III or IV. Group A plastics not otherwise classified are included in this class. Examples of high-hazard commodities include, but are not limited to, the following:

Aerosol, Level 3 (see Article 88)

Alcoholic beverages, exceeding 80 percent alcohol, in bottles or cartons

Commodities of any class in plastic containers in carousel storage.

Flammable solids (except solid combustible metals)

Glycol in combustible containers (50 percent or greater)

Lacquers, which dry by solvent evaporation, in metal cans or cartons

Lubricating or hydraulic fluid in plastic containers

Mattresses, foamed rubber or foamed plastics

Pallets and flats which are idle combustible

Paper, asphalt, rolled, horizontal storage

Paper, asphalt, rolled, vertical storage

Paper and pulp, rolled, in vertical storage which is unbanded or not protected with an approved wrap

Pillows, foamed rubber and foamed plastics

Pyroxylin

Rubber tires

Vegetable oil and butter in plastic containers

8101.4.2 Classification of Plastics.

8101.4.2.1 General. Plastics shall be designated as Group A, B or C in accordance with Section 8101.4.2.

8101.4.2.2 Group A Plastics. Group A plastics are plastic materials having a heat of combustion that is much higher than that of ordinary combustibles, and a burning rate higher than that of Group B plastics. Examples of Group A plastics include, but are not limited to, the following:

ABS (acrylonitrile-butadiene-styrene copolymer)

Acetal (polyformaldehyde)

Acrylic (polymethyl methacrylate)

Butyl rubber

EPDM (ethylene-propylene rubber)

FRP (fiberglass-reinforced polyester)

Natural rubber (expanded)

Nitrile rubber (acrylonitrile-butadiene rubber)

PET or PETE (polyethylene terephthalate)

Polybutadiene

Polycarbonate

Polyester elastomer

Polyethylene

Polypropylene

Polystyrene (expanded and unexpanded)

Polyurethane (expanded and unexpanded)

PVC (polyvinyl chloride greater than 15 percent plasticized, e.g., coated fabric unsupported film)

SAN (styrene acrylonitrile)

SBR (styrene-butadiene rubber)

8101.4.2.3 Group B Plastics. Group B plastics are plastic materials having a heat of combustion and a burning rate higher than that of ordinary combustibles, but not as high as those of Group A plastics. Examples of Group B plastics include, but are not limited to, the following:

Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)

Chloroprene rubber

Fluoroplastics (ECTFE, ethylene-chlorotrifluoroethylene copolymer; ETFE, ethylene-tetrafluoroethylene copolymer; FEP, fluorinated ethylene-propylene copolymer)

Natural rubber (nonexpanded)

Nylon (Nylon 6, Nylon 6/6)

PVC (polyvinyl chloride greater than 5 percent, but not exceeding 15 percent plasticized)

Silicone rubber

8101.4.2.4 Group C Plastics. Group C plastics are plastic materials which have a heat of combustion and a burning rate similar to those of ordinary combustibles. Examples of Group C plastics include, but are not limited to, the following:

Fluoroplastics (PCTFE, polychlorotrifluoroethylene; PTFE, polytetrafluoroethylene)

Melamine (melamine formaldehyde)

Phenol

PVC (polyvinyl chloride, rigid or plasticized less than 5 percent, e.g., pipe, pipe fittings)

PVDC (polyvinylidene chloride)

PVDF (polyvinylidene fluoride)

PVF (polyvinyl fluoride)

Urea (urea formaldehyde)

8101.4.3 Limited Quantities of Group A Plastics in Mixed Commodities. Figure 8101.4-A shall be used to determine the quantity of Group A plastics allowed to be stored in a package or carton or on a pallet without increasing the commodity classification.

8101.5 Designation of High-piled Storage Areas.

8101.5.1 General. High-piled storage areas, and portions of high-piled storage areas intended for storage of a different commodity class than adjacent areas, shall be designed and specifically designated to contain Class I, Class II, Class III, Class IV or high-hazard commodities. The designation of a high-piled combustible storage area, or portion thereof intended for storage of a different commodity class, shall be based on the highest hazard commodity class stored except as provided in Section 8101.5.2.

8101.5.2 Designation Based on Engineering Analysis. The designation of a high-piled combustible storage area, or portion thereof, is allowed to be based on a lower hazard class than that of the highest class of commodity stored when a limited quantity of the higher hazard commodity has been demonstrated by engineering analysis to be adequately protected by the sprinkler system provided. The engineering analysis shall consider the ability of the sprinkler system to deliver the higher density required by the higher-hazard commodity. The higher density shall be based on the actual storage height of the pile or rack and the minimum allowable design area for sprinkler operation as set forth in the density/area figures provided in Section 9002, UFC Standards 81-1 and 81-2. The contiguous area occupied by higher-hazard commodity shall not exceed 120 square feet (11.15 m²), and additional areas of higher-hazard commodity shall be separated from other such areas by 25 feet (7620 mm) or more.

The sprinkler system shall be capable of delivering the higher density over a minimum area of 900 square feet (83.6 m²) for wet pipe systems and 1,200 square feet (111.5 m²) for dry pipe systems. The shape of the design area shall be in accordance with the Building Code (see Section 9002, Standard 10-3).

8101.6 Housekeeping and Maintenance.

8101.6.1 Rack Structures. The structural integrity of racks shall be maintained.

8101.6.2 Ignition Sources.

8101.6.2.1 General. Clearance from ignition sources shall be provided in accordance with Section 1109.

8101.6.2.2 Smoking. Smoking shall be prohibited. Approved NO SMOKING signs shall be conspicuously posted. See Section 1109.4.

8101.6.3 Aisle Maintenance. When restocking is not being conducted, aisles shall be kept clear of storage, waste material and debris. Fire department access doors, aisles and exit doors shall not be obstructed.

During restocking operations using manual stocking methods, a minimum unobstructed aisle width of 24 inches (609.6 mm) shall be maintained in 48-inch (1219.2 mm) or smaller aisles, and a minimum unobstructed aisle width of one half of the required aisle width shall be maintained in aisles greater than 48 inches (1219.2 mm). During mechanical stocking operations, a minimum unobstructed aisle width of 44 inches (1117.6 mm) shall be maintained. See Section 8102.10.

8101.6.4 Pile Dimension and Height Limitations. See Section 8103.3.

8101.6.5 Arrays. See Section 8103.4.

8101.6.6 Flue Spaces. See Section 8104.3.

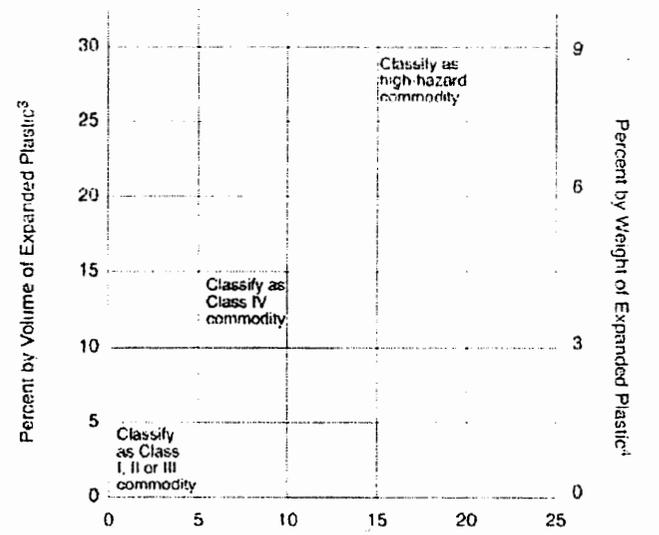


FIGURE 8101.4-A—MIXED COMMODITIES^{1,2}
(See Section 8101.4.3)

¹This table is intended to determine the commodity classification of a mixed commodity in a package, carton or on a pallet when plastics are involved.

²The following is an example of how to apply the table: A package containing a Class III commodity has 12 percent Group A expanded plastic by volume. The weight of the unexpanded Group A plastic is 10 percent. This commodity is classified as a Class IV commodity. If the weight of the unexpanded plastic is increased to 14 percent, the classification changes to a high-hazard commodity.

³Percent by volume = $\frac{\text{Volume of plastic in pallet load}}{\text{Total volume of pallet load including pallet}}$

⁴Percent by weight = $\frac{\text{Weight of plastic in pallet load}}{\text{Total weight of pallet load including pallet}}$

SECTION 8102 — GENERAL FIRE-PROTECTION AND LIFE-SAFETY FEATURES

8102.1 General. Fire-protection and life-safety features for high-piled storage areas shall be in accordance with Section 8102. Nationally recognized standards or guidelines, as applicable, are allowed to be used when approved.

8102.2 Extent and Type of Protection. Fire-detection systems, smoke and heat removal, curtain boards, small hose valves and stations, and fire sprinkler design densities shall extend the lesser of 15 feet (4572 mm) beyond the high piled storage area or to a permanent partition. When portions of high-piled storage areas have different fire-protection requirements due to commodity, method of storage or storage height, the fire-protection features required by Table 81-A within this area shall be based on the most restrictive design requirements.

8102.3 Separation of High-piled Storage Areas.

8102.3.1 Separation from Other Uses. Mixed occupancies shall be separated per the Building Code.

8102.3.2 Multiple High-piled Storage Areas.

8102.3.2.1 General. The aggregate of all high-piled storage areas within a building shall be used for application of Table 81-A unless such areas are separated from each other by one-hour-rated fire-resistive walls constructed in accordance with the Building Code. Openings in such walls shall be protected by fire assemblies having a one-hour fire-protection rating.

8102.3.2.2 Multiclass High-piled Storage Areas. High-piled storage areas classified as Class I through Class IV not separated from high-piled storage areas classified as high hazard shall utilize the aggregate of all high-piled storage areas as high hazard for purposes of application of Table 81-A. To be considered as separated, one-hour-rated fire-resistive walls shall be constructed in accordance with the Building Code. Openings in such walls shall be protected by fire assemblies having a one-hour fire-protection rating.

The requirements of Table 81-B shall be applied separately over each high-piled storage area for portions of storage areas having different requirements due to commodity classification or storage height.

8102.4 Fire Sprinklers. Fire sprinkler systems shall be provided in accordance with Sections 8103 and 8104.

8102.5 Fire Detection. When fire detection is required by Table 81-A, an approved automatic fire-detection system shall be installed throughout the high-piled storage area. The system shall be monitored and shall be in accordance with Section 1006.

8102.6 Building Access.

8102.6.1 Access Roadways. When building access is required by Table 81-A, access roadways shall be provided to within 150 feet (45.7 mm) of all portions of the exterior walls of buildings used for high-piled storage.

EXCEPTION: When access roads cannot be installed due to topography, railways, waterways, nonnegotiable grades or other similar conditions, the chief is authorized to require additional fire protection as required for special hazards in Section 1001.9.

Specifications for fire apparatus access roads shall be in accordance with Section 902.2.

SECTION 8106 — SPECIALTY STORAGE

and 8104 and Section 9002, UFC Standard 81-4. Palletized storage of records shall be in accordance with Section 8103.1.

8106.1 General. Records storage facilities used for the rack or shelf storage of combustible paper records greater than 12 feet (3658 mm) in height shall be in accordance with Sections 8102

TABLE 81-A—GENERAL FIRE-PROTECTION AND LIFE-SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA ¹ (square feet) (See Sections 8102.2 and 8102.4)	ALL STORAGE AREAS (See Sections 8102, 8103 and 8104) ²						SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (See Section 8103.3)		
		Automatic Fire-extinguishing System (See Section 8102.4)	Fire-detection System (See Section 8102.5)	Building Access (See Section 8102.6)	Smoke and Heat Removal (See Section 8102.7)	Curtain Boards (See Section 8102.8)	Small Hose Valves and Stations (See Section 8102.9)	Maximum Pile Dimension ³ (feet)	Maximum Permissible Storage Height ⁴ (feet)	Maximum Pile Volume (cubic feet)
	× 0.0929 for m ²							× 3048 for mm	× 0.0283 for m ³	
I-IV	0-500	NR ¹	NR	NR ⁵	NR	NR ⁶	NR	NR	NR	NR
	501-2,500	NR ¹	Yes	NR ⁵	NR	NR ⁶	NR	100	40	100,000
	2,501-12,000 Public accessible	Yes	NR	NR ⁵	NR	NR ⁶	NR	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 1)	Yes	NR	NR ⁵	NR	NR ⁶	NR	100	40	400,000
	2,501-12,000 Nonpublic accessible (Option 2)	NR ¹	Yes	Yes	Yes	Yes	Yes	100	30 ⁷	200,000
	12,001-20,000	Yes	NR	Yes	Yes	NR ⁶	Yes	100	40	400,000
	20,001-500,000	Yes	NR	Yes	Yes	NR ⁶	Yes	100	40	400,000
	Greater than 500,000 ⁸	Yes	NR	Yes	Yes	NR ⁶	Yes	100	40	400,000
High hazard	0-500	NR ¹	NR	NR ⁵	NR	NR ⁶	NR	50	NR	NR
	501-2,500 Public accessible	Yes	NR	NR ⁵	NR	NR ⁶	NR	50	30	75,000
	501-2,500 Nonpublic accessible (Option 1)	Yes	NR	NR ⁵	NR	NR ⁶	NR	50	30	75,000
	501-2,500 Nonpublic accessible (Option 2)	NR ¹	Yes	Yes	Yes	Yes	Yes	50	20	50,000
	2,501-300,000	Yes	NR	Yes	Yes	NR ⁶	Yes	50	30	75,000
	300,001-500,000 ^{8,9}	Yes	NR	Yes	Yes	NR ⁶	Yes	50	30	75,000

NR = Not required.

¹When fire sprinklers are required for reasons other than Article 81, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 8103 and 8104.

²For aisles, see Section 8102.10.

³Piles shall be separated by aisles complying with Section 8102.10.

⁴For storage in excess of the height indicated, special fire protection shall be provided in accordance with Footnote 8 when required by the chief. See also Articles 79 and 88 for special limitations for flammable and combustible liquids and aerosols.

⁵Section 902.2 shall apply for fire apparatus access.

⁶Curtain boards shall be installed as required by the Building Code. See UBC Section 906.

⁷For storage exceeding 30 feet (914 mm) in height, Option 1 shall be used.

⁸Special fire-protection provisions such as, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided when required by the chief.

⁹High-piled storage areas shall not exceed 500,000 square feet (46 451.5 m²). A two-hour area separation wall shall be used to divide high-piled storage exceeding 500,000 square feet (46 451.5 m²) in area.

TABLE 81-B—REQUIREMENTS FOR CURTAIN BOARDS AND SMOKE VENTING¹
(See Sections 8102.7.4 and 8102.8.3)

COMMODITY CLASSIFICATION	DESIGNATED STORAGE HEIGHT (feet)	CURTAIN BOARD DEPTH (feet)	MAXIMUM AREA FORMED BY CURTAIN BOARDS ² (square feet)	VENT AREA TO FLOOR AREA RATIO	MAXIMUM SPACING OF VENT CENTERS (feet)	MAXIMUM DISTANCE TO VENTS FROM WALL OR CURTAIN BOARDS ³ (feet)
	× 3048 for mm		× 0.0929 for m ²		× 3048 for mm	
I-IV (Option 1)	20 or less	6	10,000	1:100	100	60
	over 20-40	6	8,000	1:75	100	55
I-IV (Option 2)	20 or less	4	3,000	1:75	100	55
	over 20-40	4	3,000	1:50	100	50
High hazard (Option 1)	20 or less	6	6,000	1:50	100	50
	over 20-30	6	6,000	1:40	90	45
High hazard (Option 2)	20 or less	4	4,000	1:50	100	50
	over 20-30	4	2,000	1:30	75	40

¹For rack storage heights in excess of those indicated, see Section 8104.5. For solid-piled storage heights in excess of those indicated, an approved engineered design shall be used.

²When areas of buildings are equipped with early suppression-fast response (ESFR) sprinklers, the curtain boards within these areas shall be located only at the separation between ESFR and conventional sprinkler systems.

³The distance specified is the maximum distance from any vent in a particular curtained area to walls or curtain boards which form the perimeter of the curtained area.

TABLE 8104.3-A—REQUIRED FLUE SPACES FOR RACK STORAGE¹

RACK CONFIGURATION	FIRE SPRINKLER PROTECTION		SPRINKLER AT THE CEILING WITH OR WITHOUT MINIMUM IN-RACK SPRINKLERS			IN-RACK SPRINKLERS AT EVERY TIER Any Height	NON-SPRINKLERED Any Height
			≤ 25 feet (7620 mm)		>25 feet (7620 mm)		
			Option 1	Option 2			
	Storage Height						
Single-Row Rack	Transverse Flue Space	Size ² (25.4 for mm)	3 inch	NA	3 inch	NR	NR
		Vertically Aligned	NR	NA	Yes	NA	NR
	Longitudinal Flue Space		NR	NA	NR	NR	NR
Double-Row Rack	Transverse Flue Space	Size ² (25.4 for mm)	6 inch ³	3 inch	3 inch	NR	NR
		Vertically Aligned	NR ³	NR	Yes	NA	NR
	Longitudinal Flue Space		NR ³	6 inch	6 inch	NR	NR
Multi-Row Rack	Transverse Flue Space	Size ² (25.4 for mm)	6 inch	NA	6 inch	NR	NR
		Vertically Aligned	NR	NA	Yes	NA	NR
	Longitudinal Flue Space		NR	NA	NR	NR	NR

¹NR means "not required." NA means "not applicable."

²Random variations are allowed, provided that the configuration does not obstruct water penetration.

³This option is not allowed with ESFR sprinkler protection.

ARTICLE 82 — LIQUEFIED PETROLEUM GASES

References NFPA 10 1998 Edition and NFPA 58 1998 Edition.

SECTION 8201 — SCOPE

Storage, handling and transportation of LP-gas and the installation of equipment pertinent to systems for such uses shall be in accordance with Article 82. For determining properties of LP-gases, see Section 9002, UFC Standard 82-1, Appendix B. Refer to ORS 480.410 through 480.460 and OAR 837-30-100 through 837-30-280 for administrative provisions pertaining to liquefied petroleum gas licensing and notification of LP-gas installations.

ORS 480.410 through 480.460 and OAR 837-30-100 through 836-30-280 are not apart of this code but are reproduced or paraphrased here for the reader's convenience:

ORS 480.410 through 480.460 are the regulations establishing minimum general standards for the design, construction, location, installation and operation of equipment for storing, handling, and transporting LPG, and establishes standards and rules for the issuance, suspension and revocation of license and permits.

OAR 837-30-100 through 837-30-280 implements the standards, policies and procedures for liquefied petroleum gas, including: Fire and Life Safety Requirements, Examinations, Tank Installations, and Penalties and Fees.

SECTION 8202 — PERMITS, PLANS AND RECORDS

8202.1 Permits and Plans. For a permit to store, use, handle or dispense LP-gas, or to install or maintain an LP-gas container see Section 105.

EXCEPTION: A permit is not required to install or maintain portable containers of less than 125 gallon (473.2 L) aggregate water capacity.

Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the chief.

Where a single container is over 2,000 gallon (7571 L) water capacity or the aggregate capacity of containers is over 4,000 gallon (15 142 L) water capacity, the installer shall submit plans for such installation.

8202.2 Records. Installers shall maintain a record of installations for which a permit is not required by Section 105 and have such record available for inspection by the chief.

EXCEPTION: Installation of gas-burning appliances and replacement of portable cylinders.

SECTION 8203 — INSTALLATION OF EQUIPMENT

8203.1 General. Liquefied petroleum gas equipment shall be installed in accordance with Section 9002, UFC Standard 82-1, except as otherwise provided in Article 82 and in other laws or regulations.

8203.2 Use of LP-gas Containers in Buildings.

8203.2.1 Portable Containers.

8203.2.1.1 General. Portable LP-gas containers, as defined in Section 9002, UFC Standard 82-1, shall not be used in

buildings except as specified in Section 9002, UFC Standard 82-1 and Section 8203.2.1.

8203.2.1.2 Use in Basement, Pit or Similar Location. LP-gas containers shall not be used in a basement, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be used in an above-grade underfloor space or basement unless such location is provided with an approved means of ventilation.

EXCEPTION: Use with self-contained torch assemblies in accordance with Section 8203.2.1.7.

8203.2.1.3 Construction and Temporary Heating. Portable containers are allowed to be used in buildings or areas of buildings undergoing construction or for temporary heating as set forth in Section 9002, UFC Standard 82-1, Sections 3-4.3, 3-4.4, 3-4.5 and 3-4.7.

8203.2.1.4 Industrial Uses. In occupancies used for industrial purposes, portable LP-gas containers are allowed to be used to supply quantities necessary for processing, research or experimentation. When manifolded, the aggregate water capacity of such containers shall not exceed 735 pounds (333.4 kg) per manifold. When multiple manifolds of such containers are present in the same room, each manifold shall be separated from other manifolds by a distance of not less than 20 feet (6096 mm).

8203.2.1.5 Educational and Institutional Uses. In occupancies used for educational and institutional purposes, portable LP-gas containers are allowed to be used for research and experimentation. Such containers shall not be used in classrooms. Such containers shall not exceed a 50 pound (22.7 kg) water capacity in occupancies used for educational purposes and shall not exceed a 12 pound (5.4 kg) water capacity in occupancies used for institutional purposes. When more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

8203.2.1.6 Demonstration Uses. Portable LP-gas containers are allowed to be used temporarily for demonstrations and public exhibitions. Such containers shall not exceed a 12 pound (5.4 kg) water capacity. When more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

8203.2.1.7 Use with Self-contained Torch Assemblies. Portable LP-gas containers are allowed to be used to supply approved self-contained torch assemblies or similar appliances. Such containers shall not exceed a 2¹/₂ pound (1.13 kg) water capacity.

8203.2.1.8 Use for Food Preparation. When approved, listed LP-gas commercial food service appliances are allowed to be used for food preparation within restaurants and in attended commercial food catering operations. See Section 9002, UFC Standard 82-1, Sections 3-4.8.4 and 5-3.1.1, Exception 1.

8203.2.2 Industrial Vehicles and Floor Maintenance Machines. Containers on industrial vehicles and floor maintenance

machines shall be in accordance with Section 9002, UFC Standard 82-1, Section 3-6.

8203.3 Location of Equipment and Piping. Equipment and piping shall not be installed in locations where such equipment and piping is prohibited by the Mechanical Code.

SECTION 8204 — LOCATION OF CONTAINERS

8204.1 General. The storage and transportation of LP-gas and the installation and maintenance of pertinent equipment shall be in accordance with Section 9002, UFC Standard 82-1 and subject to the approval of the chief, except as provided in Article 82.

8204.2 Maximum Capacity Within Established Limits. Within the limits established by law restricting the storage of LP-gas for the protection of heavily populated or congested commercial areas, the aggregate capacity of any one installation shall not exceed a 2,000 gallon (7571 L) water capacity (see sample adoption ordinance, Section 5).

8204.3 Container Location. Containers shall be located with respect to buildings, public ways, and lines of adjoining property which can be built on in accordance with Table 8204-A.

Containers shall also be located with respect to special hazards such as aboveground flammable or combustible liquid tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in Section 9002, UFC Standard 82-1, Section 3-2.2.6. See Section 7902.2.3.3.

8204.4 Multiple Container Installation. Multiple container installations with a total water storage capacity of more than 180,000 gallons (681 374 L) [150,000 gallon (567 811 L) LP-gas capacity] shall be subdivided into groups containing not more than 180,000 gallons (681 374 L) in each group. Such groups shall be separated by a distance of not less than 50 feet (15 240 mm), unless the containers are:

1. Mounded in an approved manner,
2. Protected with approved insulation on areas that are subject to impingement of ignited gas from pipelines or other leakage,
3. Protected by firewalls of approved construction,
4. Protected by an approved system for application of water as specified in Section 9002, UFC Standard 82-1, Table 3-2.2.4, or
5. Protected by other approved means.

Where one of these forms of protection is provided, the separation shall not be less than 25 feet (7620 mm) between container groups.

SECTION 8205 — PROHIBITED USE OF LP-GAS

8205.1 Nonapproved Equipment. Liquefied petroleum gas shall not be used for the purpose of operating devices or equipment unless such device or equipment is approved for use with LP-gas.

8205.2 Release to the Atmosphere. Liquefied petroleum gas shall not be released to the atmosphere, except through an approved liquid-level gauge or other approved device.

SECTION 8206 — DISPENSING AND OVERFILLING

8206.1 Attendants. Dispensing of LP-gases shall be performed by a qualified attendant.

8206.2 Overfilling. Liquefied petroleum gas containers shall not be filled or maintained with LP-gas in excess of the fixed outage gauge installed by the manufacturer or the weight stamped on the tank.

8206.3 Dispensing Locations. The point of transfer of LP-gas from one container to another shall be separated from exposures as specified in Section 9002, UFC Standard 82-1, Section 4-3.

SECTION 8207 — SAFETY DEVICES

Safety devices on LP-gas containers, equipment and systems shall not be tampered with or made ineffective.

SECTION 8208 — SMOKING AND OTHER SOURCES OF IGNITION

NO SMOKING signs shall be posted when required by the chief. Smoking within 15 feet (4572 mm) of a point of transfer, while filling operations are in progress at containers or vehicles, shall be prohibited.

For control of other sources of ignition, refer to Section 9002, UFC Standard 82-1, Section 3-8.

SECTION 8209 — CLEARANCE TO COMBUSTIBLES

Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from LP-gas tanks or containers.

SECTION 8210 — PROTECTING CONTAINERS FROM VEHICLES

When exposed to probable vehicular damage due to proximity to alleys, driveways or parking areas, LP-gas containers, regulators and piping shall be suitably protected.

SECTION 8211 — FIRE PROTECTION

8211.1 General. Fire protection shall be provided for installations having storage containers of more than a 4,000 gallon (15 141 L) water capacity, as required by Section 9002, UFC Standard 82-1, Section 3-10.

8211.2 Fire Extinguishers. Fire extinguishers shall be provided as specified in Section 9002, UFC Standard 82-1, and in accordance with Section 9002, UFC Standard 10-1.

SECTION 8212 — STORAGE OF PORTABLE CONTAINERS AWAITING USE OR RESALE

8212.1 General. Storage of portable containers of 1,000 pounds (453.6 kg) or less, whether filled, partially filled or empty, at consumer sites or distributing points, and for resale by dealers or resellers shall be in accordance with Section 8212.

EXCEPTIONS: 1. Containers which have not previously been in LP-gas service.

2. Containers at distributing plants.

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3. Containers at consumer sites or distributing points, which are connected for use.

8212.2 Exposure Hazards. Containers in storage shall be located in a manner which minimizes exposure to excessive temperature rise, physical damage or tampering.

8212.3 Position. Containers in storage having individual water capacity greater than 2½ pounds (1.3 kg) [nominal 1 pound (0.45 kg) LP-gas capacity] shall be positioned with the pressure-relief valve in direct communication with the vapor space of the container.

8212.4 Separation from Means of Egress. Containers stored in buildings in accordance with Sections 8212.9 and 8212.11 shall not be located near exit-access doors, exits, stairways, or in areas normally used, or intended to be used, for the safe egress of people.

8212.5 Quantity. Empty containers which have been in LP-gas service shall be considered as full containers for the purpose of determining the maximum quantities of LP-gas allowed in Sections 8212.9 and 8212.11.

8212.6 Storage on Roofs. Containers which are not connected for use shall not be stored on roofs.

8212.7 Storage in Basement, Pit or Similar Location. Liquefied petroleum gas containers shall not be stored in a basement, pit or similar location where heavier-than-air gas might collect. Liquefied petroleum gas containers shall not be stored in above-grade underfloor spaces or basements unless such location is provided with an approved means of ventilation.

EXCEPTION: Department of Transportation (DOT) specification cylinders with a maximum water capacity of 2½ pounds (1.13 kg) for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds (9.07 kg).

8212.8 Protection of Valves on Containers in Storage. Container valves shall be protected by screw-on-type caps or collars which shall be securely in place on all containers stored regardless of whether they are full, partially full or empty. Container outlet valves shall be closed or plugged.

8212.9 Storage Within Buildings Accessible to the Public. Department of Transportation (DOT) specification cylinders with maximum water capacity of 2½ pounds (1.13 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building accessible to the public. The quantity of LP-gas shall not exceed 200 pounds (90.7 kg) except as provided in Section 8212.11.

8212.10 Storage Within Buildings Not Accessible to the Public.

8212.10.1 Maximum quantity. The maximum quantity allowed in one storage location in buildings not accessible to the public, such as industrial buildings, shall not exceed 735-pound (333.4 kg) water capacity [nominal 300 pounds (136 kg) of LP-gas]. If additional storage locations are required on the same floor within the same building, they shall be separated by a minimum of 300 feet (91.4 m). Storage beyond these limitations shall be in accordance with Section 8212.11.

8212.10.2 Quantities on Equipment and Vehicles. Containers carried as part of service equipment on highway mobile vehicles need not be considered in the total storage capacity in Section 8212.10.1, provided such vehicles are stored in private

garages and do not carry more than three LP-gas containers with a total aggregate LP-gas capacity not exceeding 100 pounds (45.4 kg) per vehicle. Container valves shall be closed.

8212.11 Storage Within Rooms Used for Gas Manufacturing.

8212.11.1 General. Storage within buildings or rooms used for gas manufacturing, gas storage, gas-air mixing and vaporization, and compressors not associated with liquid transfer shall be in accordance with Section 8212.11.

8212.11.2 Quantity Limits. The maximum quantity of LP-gas shall be 10,000 pounds (4536 kg).

8212.11.3 Construction. The construction of such buildings and rooms shall comply with requirements for Group H Occupancies in the Building Code; Section 9002, UFC Standard 82-1, Chapter 7; and the following:

1. Adequate vents shall be provided to the outside at both top and bottom, located at least 5 feet (1524 mm) from building openings, and

2. The entire area shall be classified for the purposes of ignition source control in accordance with Section 9002, UFC Standard 82-1, Section 3-8.

8212.12 Location of Storage Outside of Buildings. Storage outside of buildings, for containers awaiting use or resale, shall be located in accordance with Table 8212-A.

8212.13 Protection of Containers. Containers shall be stored within a suitable enclosure or otherwise protected against tampering.

8212.14 Alternate Location and Protection of Storage. When the provisions of Sections 8212.12 and 8212.13 are impractical at construction sites, or at buildings or structures undergoing major renovation or repairs, the storage of containers shall be as required by the chief.

SECTION 8213 — CONTAINERS NOT IN SERVICE

8213.1 Temporarily Out of Service. Containers whose normal use has been temporarily discontinued shall:

1. Be disconnected from appliance piping,
2. Have container outlets, except relief valves, closed or plugged, and
3. Be positioned with the relief valve in direct communication with container vapor space.

8213.2 Permanently Out of Service. Containers to be placed permanently out of service shall be removed from the site.

SECTION 8214 — PARKING AND GARAGING

8214.1 General. Parking of LP-gas tank vehicles shall be in accordance with Section 8214.

EXCEPTION: In cases of accident, breakdown or other emergencies, tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

8214.2 Unattended Parking.

8214.2.1 Near Residential, Educational and Institutional Occupancies and Other High Risk Areas. Liquefied petroleum gas tank vehicles shall not be left unattended at any time on

**TABLE 8212-A—LOCATION OF CONTAINERS AWAITING USE
OR RESALE STORED OUTSIDE OF BUILDINGS**

QUANTITY OF LP-GAS STORED	DISTANCES TO A BUILDING OR GROUP OF BUILDINGS, PUBLIC WAY, OR LINE OF PROPERTY THAT CAN BE BUILT UPON (feet)
× 0.45 for kg	× 304.8 for mm
500 lb. or less	0
501 to 2,500 lb.	10 ¹
2,501 to 6,000 lb.	15
6,001 to 10,000 lb.	20
Over 10,000 lb.	25

¹Containers may be located a lesser distance to buildings when approved.

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ARTICLE 83

(NOT USED)

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ARTICLE 84 — MOTION PICTURE PROJECTION

SECTION 8401 — SCOPE

The use of ribbon-type cellulose acetate and other safety film in conjunction with electric arc, xenon or other light source projection equipment which develops hazardous gases, dust or radiation and the projection of ribbon-type cellulose nitrate film, regardless of the light source used in projection, shall be in accordance with Article 84.

SECTION 8402 — PROJECTION ROOMS

8402.1 General. Motion picture projection machines shall be operated within a motion picture projection room complying with the Building Code.

8402.2 Safety Film. Projection rooms which are limited to the projection of safety film shall be posted on the outside of each projection room door and within the projection room with a conspicuous sign having 1-inch (25.4 mm) block letters stating SAFETY FILM ONLY IS PERMITTED IN THIS ROOM.

8402.3 Fire Extinguishers. Two approved fire extinguishers with a minimum 10-B:C rating shall be installed and maintained ready for use in projection rooms.

SECTION 8403 — SMOKING

Smoking and other sources of ignition shall be prohibited within projection rooms in which cellulose nitrate film is allowed. Conspicuous NO SMOKING signs shall be posted in the room.

SECTION 8404 — PROJECTION EQUIPMENT

Projection equipment or film which is in a hazardous condition shall not be used.

SECTION 8405 — FILM STORAGE AND USE

8405.1 Cellulose Nitrate. Cellulose nitrate film shall not be used or stored unless within an enclosed film magazine, an approved storage cabinet or a transportation container. Rewinding of cellulose nitrate film shall be performed within an enclosed film rewind machine. Examination of film on an open hand rewind machine shall not involve more than one reel outside of an approved container at any time.

8405.2 Safety Film. Safety film, which is not mounted for projection, shall be stored in approved transportation containers or an approved film cabinet.

ARTICLE 85 — ELECTRICAL EQUIPMENT AND WIRING

SECTION 8501 — SCOPE

Permanent and temporary use of electrical appliances, fixtures, motors and wiring shall be in accordance with Article 85.

EXCEPTION: Low-voltage wiring, such as communications and signal wiring.

Article 85 shall be enforced in cooperation with the authority having jurisdiction for the enforcement of the Electrical Code.

SECTION 8502 — DEFINITIONS

For definitions of APPLIANCE, PORTABLE; APPLIANCE, STATIONARY; EXTENSION CORD; FLEXIBLE CORD; MULTIPLUG ADAPTER; PANEL BOARD, ELECTRICAL; PERMANENT WIRING; POWER TAP; RECEPTACLE; SWITCHBOARD, ELECTRICAL; and TEMPORARY WIRING, see Article 2.

SECTION 8503 — USE OF TEMPORARY WIRING

8503.1 During Construction. Temporary wiring for electrical power and lighting installations is allowed during periods of construction, remodeling, repair or demolition of buildings, structures, equipment or similar activities.

8503.2 During Special Events and Holidays. Temporary wiring for electrical power and lighting installations is allowed for a period not to exceed 90 days for Christmas decorative lighting, carnivals and similar purposes, and for experimental or developmental work.

8503.3 Attachment to Structures. When temporary wiring is attached to a structure, it shall be attached in an approved manner.

SECTION 8504 — ABATEMENT OF ELECTRICAL HAZARDS

When electrical hazards are identified, measures to abate such conditions shall be taken. Identified hazardous electrical conditions in permanent wiring or temporary wiring shall be corrected in cooperation with the authority enforcing the Electrical Code.

Electrical wiring, devices, appliances and other equipment which are modified or damaged and constitute an electrical shock or fire hazard shall not be used.

8504.1 Maintenance. Electrical system shall be maintained in an approved operative condition. See also Section 103.4.1.2.

SECTION 8505 — ELECTRICAL MOTORS

Electrical motors shall be maintained in a manner free from accumulations of oil, dirt, waste and other debris which will interfere with required motor ventilation or create a fire hazard.

SECTION 8506 — EXTENSION CORDS AND FLEXIBLE CORDS

8506.1 General. Extension cords shall not be used as a substitute for permanent wiring.

8506.2 Use with Portable Appliances.

8506.2.1 General. The use of extension cords shall be in accordance with Section 8506.2.

8506.2.2 Applications. Extension cords shall be used only with portable appliances.

8506.2.3 Power Supply. Extension cords shall be plugged directly into an approved receptacle, power tap or multiplug adapter and shall, except for approved multiplug extension cords, serve only one portable appliance.

8506.2.4 Ampacity. The ampacity of the extension cords shall not be less than the rated capacity of the portable appliance supplied by the cord.

8506.2.5 Maintenance. The extension cords shall be maintained in good condition without splices, deterioration or damage.

8506.2.6 Grounding. Extension cords shall be grounded when servicing grounded portable appliances.

8506.3 Installation. Extension cords and flexible cords shall not be affixed to structures; extend through walls, ceilings, floors, under doors or floor coverings; or be subject to environmental or physical damage.

SECTION 8507 — MULTIPLUG ADAPTERS

Multiplug adapters, such as multiplug extension cords, cube adapters, strip plugs and other devices, that do not comply with this code or the Electrical Code shall not be used.

SECTION 8508 — POWER TAPS

8508.1 General. The use of power taps shall be in accordance with Section 8508.

8508.2 Design. Power taps shall be of the polarized or grounded type, having overcurrent protection, and shall be listed.

8508.3 Power Supply. The power taps shall be directly connected to a permanently installed receptacle.

8508.4 Installation. Power tap cords shall not extend through walls, ceilings, floors, under doors or floor coverings, or be subject to environmental or physical damage.

SECTION 8509 — ACCESS TO SWITCHBOARDS AND PANELBOARDS

8509.1 General. Work space around switchboards and panelboards shall be provided and maintained as required by the Electrical Code. Such space shall not be used for storage.

8509.2 Access. A clear and unobstructed means of access with a minimum width of 30 inches (762 mm) and a minimum height of 78 inches (1981 mm) shall be maintained from the operating face of the switchboard or panelboard to an aisle or corridor.

EXCEPTIONS: 1. Where reduced dimensions are allowed by the Electrical Code.

2. Access openings into attics or under-floor areas which provide a minimum clear opening of 22 inches by 30 inches (559 mm by 762 mm).

8509.3 Labeling. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating

ELECTRICAL ROOM or similar approved wording. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.

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ARTICLE 86 — Fire Protection Plan Urban-Wildland Interface (UWI) Areas

SECTION 8601 — GENERAL

A Fire Protection Plan (FPP), Approval by the Fire Chief, shall be required for all new development within declared Urban-Wildland Interface (UWI) areas.

The FPP shall include mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation, and climate of the proposed site.

The FPP shall address water supply, access, building ignition and fire resistance, fire protection systems and equipment, defensible space and vegetation management.

The FPP shall be consistent with the Interface Code, or, at the option of the Fire Chief, with other nationally recognized standards and good practice.

ARTICLE 87 — FIRESAFETY DURING CONSTRUCTION, ALTERATION OR DEMOLITION OF A BUILDING

SECTION 8701 — SCOPE

Buildings undergoing construction, alteration or demolition shall be in accordance with Article 87.

SECTION 8702 — PERMITS

For permits to conduct asbestos-removal operations regulated by Section 8707, contact the State of Oregon, Department of Environmental Quality.

SECTION 8703 — APPROVALS

Approval of the safety precautions required for buildings being constructed, altered or demolished may be required by the chief in addition to other approvals required for specific operations or processes associated with such construction, alteration or demolition.

EXCEPTION: Buildings designated as Group R, Division 3 or Group U do not require approval of safety precautions.

SECTION 8704 — FIRESAFETY DURING CONSTRUCTION

8704.1 General. Buildings under construction shall be in accordance with Section 8704.

8704.2 Access Roads. Fire department access roads shall be established and maintained in accordance with Section 902.

EXCEPTION: When approved, temporary access roads of a width, vertical clearance and surface which provide access for fire department apparatus are allowed to be used until permanent roads are installed.

8704.3 Water Supply. Water mains and hydrants shall be installed and operational in accordance with Section 903.

EXCEPTION: When approved, a temporary water supply for fire protection is allowed to be used until permanent fire-protection systems are installed.

8704.4 Fire Protection.

8704.4.1 General. During the construction of a building and until the permanent fire-extinguishing system has been installed and is in service, fire protection shall be provided in accordance with Section 8704.

8704.4.2 Fire Extinguishers. Fire extinguishers shall be provided for buildings under construction when required by the chief. The number and type of extinguishers shall be as required by the chief, and the type of extinguisher shall be suitable for the type of fire associated with the hazards present.

8704.4.3 Standpipes.

8704.4.3.1 Where Required. Every building four stories or more in height shall be provided with not less than one standpipe for use during construction. Such standpipes shall be installed when the progress of construction is not more than 35 feet (10 668 mm) in height above the lowest level of fire department access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs and the standpipe outlets shall be located adjacent to such usable stairs. Such standpipe systems shall be extended

as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

On each floor there shall be provided a 2 1/2 inch (63.5 mm) valve outlet for fire department use. Where construction height requires installation of a Class III standpipe, fire pumps and water main connections shall be provided to serve the standpipe.

8704.4.3.2 Temporary Standpipes. Temporary standpipes are allowed to be provided in place of permanent systems if they are designed to furnish 500 gallons (1893 L) of water per minute at 50 pounds per square inch (345 kPa) pressure with a standpipe size of not less than 4 inches (101.6 mm). All outlets shall not be less than 2 1/2 inches (63.5 mm). Pumping equipment sufficient to provide this pressure and volume shall be available at all times when a Class III standpipe system is required.

8704.4.3.3 Detailed Requirements. Standpipe systems for buildings under construction shall be installed as required for permanent standpipe systems.

8704.5 Combustible Debris. Combustible debris shall not be accumulated within buildings. Combustible debris, rubbish and waste material shall be removed from buildings as often as practical. Combustible debris, waste material and trash shall not be burned on the site unless approved.

8704.5.1 Combustible Trash Chutes.

8704.5.1.1 General. Combustible trash chutes shall not be used on nonsprinklered buildings.

EXCEPTION: Nonsprinklered Type I or Type II structures under initial construction prior to the installation of combustible interior finish or on preexisting noncombustible exterior buildings not exceeding four stories in height (48 feet) (14 630 mm) with an approved safety plan.

8704.5.1.2 Combustible Trash Chutes Used On Sprinklered Buildings. Combustible trash chutes when used on sprinklered buildings shall have an approved safety plan when the exterior is combustible or the building exceeds two stories (28 feet) (83534 mm) in height.

8704.5.1.3 Approved Safety Plans. An approved safety plan shall address the following:

- 1. A continuous fire watch (working hours only) stationed at the dropbox(es) with a continuous means of water application and a means of communication (radio or cell phone).
2. Water application shall be provided at each chute access opening or an approved barrier for each exposed building opening and all exposed combustible exterior surfaces shall be provided. The approved barrier shall extend 3 feet (914 mm) to each side of the chute.
3. Where water is required at the chute access, a trained person shall be continuously assigned and an approved means of communication or alarm shall be provided.

4. Signage shall be placed at each chute access to address: NO SMOKING, NO OPEN FLAME, NO WELDING OR CUTTING WITH 20 FEET (6096 MM).

8704.6 Motor Equipment. Internal-combustion-powered construction equipment shall be used in accordance with the following:

1. Equipment shall be located so that exhausts do not discharge against combustible material,
2. When possible, exhausts shall be piped to the outside of the building,
3. Equipment shall not be refueled while in operation, and
4. Fuel for equipment shall be stored in an approved area outside of the building.

8704.7 Heating Devices. Temporary heating devices shall be of an approved type, located away from combustible materials, and attended and maintained by competent personnel.

8704.8 Smoking. Smoking shall be prohibited, except in those areas approved. When required by the chief, a suitable number and type of NO SMOKING signs shall be posted.

8704.9 Cutting and Welding. Cutting and welding operations shall be in accordance with Article 49.

8704.10 Flame-producing Equipment. The use of torches or flame-producing devices for the sweating of pipe joints shall be in accordance with Article 49.

8704.11 Flammable Liquids. The storage, use and handling of flammable liquids shall be in accordance with Article 79. Ventilation shall be provided for operations utilizing the application of materials containing flammable solvents.

8704.12 Open-flame Devices. Open-flame devices and other sources of ignition shall not be located in areas where flammable materials are being used.

8704.13 Asphalt and Tar Kettles. Asphalt and tar kettles shall be located and operated in accordance with Section 1105.

8704.14 Temporary Electrical Wiring. Temporary electrical wiring shall be in accordance with Section 8503.

8704.15 Building Access. When required by the chief, access to buildings for the purpose of firefighting shall be provided. Construction material shall not block access to buildings, hydrants or fire appliances.

8704.16 Emergency Telephone. When required by the chief, telephone facilities shall be provided at the construction site for the purpose of emergency notification of the fire department. The street address of the construction site shall be posted adjacent to the telephone together with the fire department telephone number.

8704.17 Fire-protection Plan. When required by the chief, a fire-protection plan shall be established.

SECTION 8705 — ALTERATIONS OF BUILDINGS

8705.1 General. Alterations of buildings shall be in accordance with the Building Code, applicable provisions of Section 8704, and Section 8705.

8705.2 Fire-protection Systems. When the building is protected by fire-protection systems, such systems shall be maintained operational at all times during alteration.

When alteration requires modification of a portion of a fire-protection system, the remainder of the system shall be kept in service. When it is necessary to shut down the entire system, a fire watch shall be kept on site until the system is returned to service.

8705.3 Means of Egress. Required means of egress components shall be maintained in accordance with Article 12.

EXCEPTION: Approved temporary means of egress system or facilities.

8705.4 Fire-resistive Assemblies and Construction. Fire-resistive assemblies and construction shall be maintained in accordance with Section 1111.

SECTION 8706 — FIRESAFETY DURING DEMOLITION

8706.1 General. Demolition of buildings shall be in accordance with Section 8706 and, where applicable, Sections 8704 and 8705.

8706.2 Automatic Sprinkler System. When a building to be demolished contains a sprinkler system, such system shall not be rendered inoperative without approval of the chief.

8706.3 Fire Hose. Suitable fire hose, as required by the chief, shall be maintained at the demolition site. Such hose shall be connected to an approved source of water and shall not impede fire department use of hydrants.

8706.4 Cutting and Welding. Demolition operations involving cutting and welding shall be in accordance with Article 49.

8706.5 Burning of Combustible Waste. Combustible waste material, trash and rubbish shall not be burned at the demolition site, unless approved. Accumulations of such material shall be removed from the site as often as necessary to minimize the hazards therefrom.

8706.6 Fire Watch. When required by the chief for building demolition which is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. The sole duty of fire-watch personnel shall be to watch for the occurrence of fire.

SECTION 8707 — ASBESTOS REMOVAL

8707.1 General. Operations involving removal of asbestos or asbestos-containing materials from buildings shall be in accordance with Section 8707.

EXCEPTION: Section 8707 does not apply to the removal of asbestos from:

1. Pumps, valves, gaskets and similar equipment.
2. Pipes, ducts, girders or beams which have a length less than 21 linear feet (6400 mm).
3. Wall or ceiling panels which have an area of less than 10 square feet (0.93 m²) or a dimension of less than 10 linear feet (3048 mm).
4. Floor tiles when the duration of work can be completed in less than four hours.
5. Group R, Division 3 Occupancies.

8707.2 Notification. The chief shall be notified 24 hours prior to the commencement and closure of asbestos-removal operations.

The permit applicant shall notify the building official when asbestos abatement involves the removal of materials which were used as a feature of the building's fire resistance.

8707.3 Plastic Film. Plastic film which is installed on building elements shall be flame resistant as required for combustible decorative material in accordance with Section 1103.3.3.

8707.4 Signs. Approved signs shall be posted at the entrance, exit and exit-access door, decontamination areas and waste-disposal areas for asbestos-removal operations. The signs shall state that asbestos is being removed from the area, that asbestos is a suspected carcinogen and that proper respiratory protection is required. Signs shall have a reflective surface and lettering shall be a minimum of 2 inches (51 mm) high.

ARTICLE 88 — AEROSOL PRODUCTS

References in Standard 88-1 and NFPA 30B 1998 Edition.

SECTION 8801 — GENERAL

8801.1 Scope. Storage and retail display of aerosol products shall be in accordance with Article 88. Aerosols shall be classified as Level 1, 2 or 3 in accordance with UFC Standard 88-1.

EXCEPTION: Level 1 aerosols in cartons which are clearly marked to identify their classification level are not regulated by Article 88.

For additional requirements for high-piled combustible storage, see Article 81, and for hazardous materials, see Article 80.

8801.2 Definitions.

8801.2.1 General. For definitions of AEROSOL, AEROSOL CONTAINERS, AEROSOL WAREHOUSE, BANDING, BASEMENT, BUILDING CODE, ENCAPSULATED, EXIT, FIRE DOOR, FLOOR AREA, GENERAL-PURPOSE WAREHOUSE, PROPELLANT, RACK STORAGE, RETAIL DISPLAY AREA, RETAIL SALES OCCUPANCY, SEGREGATED, SHELF STORAGE, SOLID SHELVING and VENT-RELEASE CONTAINER, see Article 2.

8801.2.2 Limited Application. For the purpose of Article 88, certain terms are defined as follows:

CARTON is a cardboard or fiberboard box in which multiple units of aerosol products are shipped. A carton completely encloses aerosol products.

WAREHOUSE is a building or portion of a building not accessible to the public which is used for storage, including shipping and receiving.

8801.3 Permits. For permits to handle or store aerosol products, see Section 105.

8801.4 Identification of Aerosol Classification. Material Safety Data Sheets (MSDS) shall identify the classification level of each aerosol product as set forth in UFC Standard 88-1.

8801.5 Carton Identification. When cartons containing aerosols are not marked to identify the classification level of the contents and the classification level is not otherwise identifiable, the contents shall be treated as Level 3 aerosol products.

SECTION 8802 — STORAGE AND RETAIL DISPLAYS

8802.1 General.

8802.1.1 Applicability. Storage and retail display of Levels 2 and 3 aerosol products in excess of 500 pounds (227 kg) net weight shall be in accordance with Section 8802.

EXCEPTION: Retail display of Levels 2 and 3 aerosols in vent-release containers in quantities less than 500 pounds (227 kg) net weight shall be in accordance with Section 8802.1.9.

8802.1.2 Containers. Containers shall be designed and constructed in accordance with nationally recognized standards. See Section 9003, Standards a.4.4 and a.4.5.

8802.1.3 Packaging. Aerosol products in storage shall be packaged in cartons. Banding of aerosol products shall not be

used in lieu of cartons or encapsulated storage of aerosol cartons. Fire-retardant cartons of aerosol products shall not be considered as an alternative to the fire-protection requirements in Article 88.

For packaging of aerosol products in retail displays, see Section 8802.2.5.

8802.1.4 Shelf Storage. Shelving shall be of substantial construction, adequately braced and anchored. For seismic requirements, see the Building Code.

When storage or retail display is on shelves, the height of such storage or retail display to the top of aerosol containers shall not exceed 8 feet (2438 mm).

8802.1.5 Storage in Basements. Aerosol products shall not be stored in basements and shall not be displayed in unprotected basements. See Table 8802.2-A.

8802.1.6 Fire-extinguishing Systems. When an automatic fire-extinguishing system is required for the storage or retail display of aerosol products, the design shall be in accordance with Section 8803.

8802.1.7 Storage Cabinets. Storage cabinets shall be constructed in accordance with Section 7902.5.9.

8802.1.8 Manual Fire Alarm System. When a manual fire alarm system is required, the system shall be in accordance with Section 1006. The manual fire alarm system shall be interconnected with the automatic fire sprinkler system such that waterflow from the sprinkler system will activate all automatic door-closing devices and the fire alarm system warning devices.

8802.1.9 Vent-release Containers.

8802.1.9.1 General. The display and storage of Levels 2 and 3 aerosols in vent-release containers shall be in accordance with Section 8802.1.9. The display and storage of vent-release containers shall be limited to the ground floor of buildings.

8802.1.9.2 Retail Display. Not more than 500 pounds (227 kg) of Levels 2 and 3 aerosols packaged in vent-release containers shall be displayed in a retail sales occupancy. Display of vent-release containers shall be limited to shelf storage.

8802.1.9.3 Storage.

8802.1.9.3.1 Storage Less Than 1,000 Pounds (454 kg). When the storage of Levels 2 and 3 aerosols packaged in vent-release containers is greater than 500 pounds (227 kg), but less than or equal to 1,000 pounds (454 kg), the storage shall be limited to an aerosol warehouse. Storage within such warehouses shall be within an area constructed as a two-hour occupancy separation. Storage shall be arranged as a solid-pile or palletized array.

EXCEPTION: Exterior aerosol storage in accordance with Section 8802.5.

8802.1.9.3.2 Storage of Greater Than 1,000 Pounds (454 kg). When the storage of Levels 2 and 3 aerosols packaged in vent-release containers is greater than 1,000 pounds (454 kg), the exterior aerosol storage provisions of Section 8802.5 shall apply.

exterior aerosol storage provisions of Section 8802.5 shall apply.

8802.1.9.4 Fire Protection.

8802.1.9.4.1 Retail Display. Protection of Levels 2 and 3 aerosols packaged in vent-release containers is not required.

8802.1.9.4.2 Storage. Protection of Levels 2 and 3 aerosols packaged in vent-release containers greater than 500 pounds (227 kg), but less than or equal to 1,000 pounds (454 kg), shall be in a room protected by an approved automatic deluge sprinkler system.

8802.2 Retail Sales Occupancies.

8802.2.1 General. Retail display and adjacent storage of aerosol products in a retail sales occupancy shall be in accordance with Sections 8802.1 and 8802.2.

8802.2.2 Maximum Quantities in Retail Display Areas. Aerosol products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities listed in Table 8802.2-A.

8802.2.3 Maximum Quantities in Storage Areas. Aerosol products in storage areas adjacent to retail display areas shall not exceed the quantities listed in Table 8802.2-B.

8802.2.4 Stacking of Containers. Aerosol containers shall not be stacked more than 6 feet (1829 mm) high from the base of the aerosol array to the top of the aerosol array unless the containers are placed on fixed shelving or otherwise secured in an approved manner.

8802.2.5 Combustible Cartons. Aerosol products located in retail display areas shall be removed from combustible cartons.

EXCEPTIONS: 1. Display using a portion of combustible cartons which consists of only the bottom panel and not more than 2 inches (51 mm) of the side panel is allowed.

2. When the retail display area is protected in accordance with Section 8803.2.2, storage of aerosols in combustible cartons is allowed.

8802.2.6 Aisles. Aisles not less than 4 feet (1219 mm) in width shall be maintained on three sides of a solid-pile or palletized retail display area containing aerosol products.

8802.3 General-purpose Warehouses and Storage Rooms.

8802.3.1 General. Storage of aerosol products in Group F, M or S Occupancy general-purpose warehouses or storage rooms shall be in accordance with Sections 8802.1 and 8802.3. General-purpose warehouses used for storing aerosols shall be used only for storage or warehousing operations involving mixed commodities.

8802.3.2 Limited Quantity Aerosol Storage. Quantities of aerosol products stored in Group F, M or S Occupancy general-purpose warehouses or storage rooms shall not exceed quantities listed in Table 8802.3-A, except as provided in Section 8802.3.3.

8802.3.3 Segregated Aerosol Storage. Solid pile, palletized and rack storage of aerosol products in excess of the quantities indicated in Table 8802.3-A stored within a Group F, M or S Occupancy general-purpose warehouse or the storage room shall be in accordance with the following:

1. The building in which the storage is located is provided with automatic fire sprinkler system protection throughout,

2. Storage conditions, storage arrangements and automatic fire sprinkler system protection shall be in accordance with Table 8802.3-B,

3. Aisles in aerosol product storage areas shall be provided in accordance with Table 8802.3-C,

4. Aerosol product storage shall be separated from flammable and combustible liquids in accordance with Article 79 and Table 8802.3-D, and

5. An approved manual fire alarm system shall be provided throughout the Group F, M or S Occupancy general-purpose warehouse or storage room.

8802.4 Aerosol Warehouses.

8802.4.1 General. Storage of aerosol products in excess of the areas and quantities indicated in Section 8802.3 shall be located within an aerosol warehouse conforming with the Building Code requirements for a Group H, Division 3 Occupancy, and Sections 8802.1 and 8802.4.

8802.4.2 Automatic Fire Sprinkler System Protection. Aerosol warehouses shall be protected throughout by automatic fire sprinkler systems designed in accordance with Tables 8803.1-A through 8803.1-F.

8802.4.3 Maximum Quantity. The maximum quantity of aerosol products within an aerosol warehouse is not limited.

8802.4.4 Manual Fire Alarm System. An approved manual fire alarm system shall be provided throughout aerosol warehouses.

8802.4.5 Other Storage. Other flammable, combustible and noncombustible commodities stored in an aerosol warehouse shall be in accordance with Section 8802.4.5 and other provisions of this code. The following commodities shall not be stored in an aerosol warehouse:

1. Class I, Class II and Class III-A liquids in nonmetallic containers.

2. Class I, Class II and Class III-A liquids in containers 1 gallon (3.79 L) or greater in size.

3. Flammable solids.

4. Flammable gases.

5. Class 4 physical hazard materials. (See Article 80.)

6. Organic peroxides.

Group A plastics (see Section 8101.4.2.2) stored with aerosol products shall be separated from the aerosol products by aisles not less than 8 feet (2438 mm) in width.

Class I, Class II and Class III-A liquids in individual metal containers less than 1 gallon (3.79 L) in size shall be separated from aerosol product storage by a minimum distance of 20 feet (6096 mm) or by a one-hour fire-resistive occupancy separation. See also Article 79.

8802.4.6 Access. Fire department access roadways and access doors shall be in accordance with Section 8102.6.

8802.4.7 Aisles. Aisles shall be provided as required for segregated aerosol storage in Table 8802.3-C.

8802.5 Exterior Storage.

8802.5.1 General. Exterior storage of aerosol products shall be in accordance with Sections 8802.1 and 8802.5. Temporary storage trailers shall be in accordance with the requirements for exterior storage.

8802.5.2 Distance from Storage to Exposures. Exterior storage of aerosol products shall be separated from exposures in accordance with Table 8802.5-A.

TABLE 8802.2-A—RETAIL DISPLAY OF LEVELS 2 AND 3 AEROSOL PRODUCTS IN RETAIL SALES OCCUPANCIES, MAXIMUM QUANTITIES

FLOOR	MAXIMUM NET WEIGHT PER FLOOR (Pounds) ^{1,2}	
	x 0.454 for kg	
	Unprotected ³	Protected ^{3,4}
Basement	Not allowed	500
Ground	2,500	10,000
Upper	500	2,000

¹When not packaged, stored and protected in accordance with Section 8803, total quantity shall not exceed 1,000 pounds (454 kg) net weight in any 100-square-foot (9.29 m²) retail display area.

²When packaged, stored and protected in accordance with Section 8803, quantities shall be limited by Table 8802.3-A. Containers of Level 2 and Level 3 aerosol products can be uncartoned or in display cut cartons when located no more than 6 feet (1829 mm) above the floor and the first tier of in-rack sprinklers is installed above the shelf unit and not more than 6 feet (1829 mm) above the floor.

³Per 25,000-square-foot (2322.5 m²) retail display area.

⁴Minimum Ordinary Hazard Group 2 wet-pipe automatic fire sprinkler system throughout retail sales occupancy.

TABLE 8802.2-B—STORAGE AREAS ADJACENT TO RETAIL DISPLAY OF LEVELS 2 AND 3 AEROSOL PRODUCTS IN RETAIL SALES OCCUPANCIES, MAXIMUM QUANTITIES

FLOOR	MAXIMUM NET WEIGHT PER FLOOR (Pounds)		
	x 0.454 for kg		
	Unseparated ^{1,2}	Separated	
Storage Cabinets ⁴		1-hour-rated Occupancy Separation	
Basement	Not allowed	Not allowed	Not allowed
Ground	2,500	5,000	See Section 8802.3
Upper	500	1,000	See Section 8802.3

¹The total aggregate quantity in storage and on retail displays shall not exceed the limits for retail display.

²In any 50,000-square-foot (46 451 m²) area.

TABLE 8802.3-A—LIMITED QUANTITY LEVELS 2 AND 3 AEROSOL PRODUCT STORAGE GENERAL-PURPOSE WAREHOUSES AND STORAGE ROOMS, MAXIMUM QUANTITIES

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds) ¹			
	x 0.454 for kg			
	Palletized or Solid Pile Storage		Rack Storage	
	Unprotected	Protected ²	Unprotected	Protected ³
2	2,500	12,000	500	24,000
3	1,000	12,000	500	24,000
Combination 2 and 3	2,500	12,000	500	24,000

¹In any 50,000-square-foot (46 451 m²) area.

²Automatic fire sprinkler system protection and storage arrangement in accordance with Table 8803.1-A or 8803.1-B for aerosol storage area with sprinkler system extended 20 feet (6096 mm) beyond the aerosol storage area.

³Automatic fire sprinkler system protection and storage arrangement in accordance with Tables 8803.1-C through 8803.1-F for aerosol storage area with sprinkler system extended 20 feet (6096 mm) beyond the aerosol storage area.

TABLE 8802.3-B—SEGREGATED LEVELS 2 AND 3 AEROSOL PRODUCT STORAGE—GENERAL-PURPOSE WAREHOUSES AND STORAGE ROOMS MAXIMUM STORAGE AREA, SPRINKLER SYSTEM AND STORAGE ARRANGEMENT

STORAGE CONDITION	MAXIMUM AGGREGATE STORAGE AREA	SPRINKLER SYSTEM AND STORAGE ARRANGEMENT
Chain link fence enclosure	10 percent of building area and not more than basic allowable building area	Footnotes 1, 2 and 3
1-hour-rated occupancy separation	10 percent of building area and not more than basic allowable building area	Footnote 1
2-hour-rated occupancy separation	20 percent of building area and not more than double basic allowable building area	Footnote 1

¹Automatic fire sprinkler system protection shall be provided in aerosol product storage areas in accordance with Tables 8803.1-A through 8803.1-F. Automatic fire sprinkler system protection shall be provided in building areas not used for aerosol product storage in accordance with the Building Code and Article 81 as applicable.

²The portion of the automatic fire sprinkler system at ceiling level shall be designed for aerosol storage 20 feet (6096 mm) beyond the aerosol storage area.

³Chain link fence enclosures shall be in accordance with the following:

1. The fence shall not be less than 9 gauge steel wire woven into a maximum 2-inch (51 mm) diamond mesh,
2. The fence shall be installed from the floor to the underside of the roof or ceiling above,
3. Class IV or V commodity storage shall not be located within 8 feet (2438 mm) from the fence,
4. Access openings in the fence shall be provided with either self-closing or automatic closing devices as set forth in the Building Code, or a labyrinth opening arrangement which will prevent aerosol containers from rocketing through such openings, and
5. Not less than two means of egress shall be provided from the fenced enclosure.

TABLE 8802.3-C—SEGREGATED LEVELS 2 AND 3 AEROSOL PRODUCT STORAGE—GENERAL-PURPOSE WAREHOUSES AND STORAGE ROOMS AISLE WIDTHS AND DISTANCE TO AISLES

STORAGE CONDITION	MINIMUM AISLE WIDTH	MAXIMUM DISTANCE FROM STORAGE TO AISLE
Solid pile or palletized ¹	4 feet (1219 mm) between piles	20 feet (6096 mm)
Racks with ESFR sprinklers ²	4 feet (1219 mm) between racks and adjacent Level 2 or 3 aerosol product storage	20 feet (6096 mm)
Racks without ESFR sprinklers ³	8 feet (2438 mm) between racks and adjacent Level 2 or 3 aerosol product storage	20 feet (6096 mm)

¹See Tables 8803.1-A and 8803.1-B.

²See Tables 8803.1-C and 8803.1-D.

³See Tables 8803.1-E and 8803.1-F.

TABLE 8802.3-D—SEGREGATED LEVELS 2 AND 3 AEROSOL PRODUCT STORAGE—GENERAL-PURPOSE WAREHOUSES AND STORAGE ROOMS SEPARATION FROM FLAMMABLE AND COMBUSTIBLE LIQUIDS

FLAMMABLE AND COMBUSTIBLE LIQUID CONTAINERS		TYPE OF SEPARATION FROM AEROSOL PRODUCTS	
Size	Type	Distance (feet)	Occupancy Separation Rating
Less than or equal to 1 gallon Greater than 1 gallon	Metal	20 feet	1 hour
	Any approved type	60 feet	2 hour

x 3.79 for L
x 304.8 for mm

TABLE 8802.5-A—EXTERIOR STORAGE OF LEVELS 2 AND 3 AEROSOL PRODUCTS—DISTANCE TO EXPOSURES

EXPOSURE	MINIMUM DISTANCE FROM AEROSOL STORAGE (feet)
Alleys, public ways, streets	20
Buildings	50
Exits to a public way	50
Property lines	20
Other exterior storage	50

x 304.8 for mm

¹A two-hour fire-resistive wall without penetration and extending not less than 30 inches (762 mm) above and to the sides of the Level 2 or 3 aerosol products storage area is allowed in lieu of the required separation distance.

SECTION 8803 — AUTOMATIC FIRE-EXTINGUISHING SYSTEMS AND STORAGE ARRANGEMENTS

8803.1 General. Design and installation of automatic fire-extinguishing systems and the storage arrangements required with such protection for the storage and retail display of aerosol products shall be in accordance with Section 8803.

8803.2 Automatic Fire-extinguishing Systems.

8803.2.1 Retail Displays. When an automatic fire-extinguishing system is required for the protected retail display of aerosol

products, the system shall be a wet-pipe automatic fire sprinkler system in accordance with the Building Code for not less than an Ordinary Hazard Group 2 Occupancy. The system shall be provided throughout the retail display area. See Sections 8802.1.6 and 8802.2.2.

8803.2.2 Storage. When an automatic fire-extinguishing system is required for the storage of aerosol products in Section 8802, the system shall be a wet-pipe automatic fire sprinkler system in accordance with the applicable provisions of Tables 8803.1-A through 8803.1-F. Protection shall be based on the

highest level of aerosol product present. The system shall be designed and installed in accordance with Section 9002, UFC Standards 81-1 and 81-2, and the Building Code, as applicable.

EXCEPTION: When approved, Level 2 aerosol products in containers with less than 1 ounce (28.3 g) net weight of flammable contents are allowed to be protected as required for Group A plastics (see Section 8101.4.2.2) in accordance with Section 9002, UFC Standards 81-1 and 81-2.

8803.2.3 In-rack Sprinkler Systems. When racks are used, control valves for in-rack sprinkler systems shall be provided in accordance with Section 9002, UFC Standard 81-2.

8803.2.4 Small Hose Connections. Small hose connections, when provided, shall be in accordance with Tables 8803.1-A through 8803.1-F and Section 9002, UFC Standard 81-1 or 81-2 as applicable.

8803.3 Draft Curtains.

Draft curtains shall be installed in the following locations:

1. At the interface between the ESFR sprinklered area and the standard sprinklered area, and
2. At the interface between the ordinary temperature-rated sprinklered area and high-temperature-rated sprinklered area.

Draft curtains required by Section 8803.3 shall be constructed of noncombustible material and shall be extended at least 24 inches (610 mm) from the ceiling.

8803.4 Storage Arrangements.

8803.4.1 General. Storage and retail display of aerosol products in solid piles, on shelves, in racks or on pallets shall be in accordance with the applicable provisions of Sections 8802 and 8803.4.

8803.4.2 Containers Not in Cartons. Retail display and storage of aerosol products outside of cartons on shelves shall be in accordance with Section 8802.2.

8803.4.3 Containers in Cartons on Pallets, in Solid Piles and on Shelves. Aerosol products in cartons on pallets, in solid piles or on shelves shall be in accordance with Tables 8803.1-A and 8803.1-B.

8803.4.4 Containers in Cartons on Racks. Aerosol products in cartons on racks shall be in accordance with Tables 8803.1-C through 8803.1-F.

Solid shelving shall not be installed in racks that are protected by a ceiling sprinkler system utilizing ESFR heads.

TABLE 8803.1-A—LEVEL 2 AEROSOL PRODUCTS ARRANGEMENT AND PROTECTION OF PALLETIZED, SOLID-PILE AND SHELF STORAGE¹

Maximum ceiling height (feet) (× 304.8 for mm)	30	30	25	25
Maximum pile height (feet) ² (× 304.8 for mm)	5	15	18	20
Sprinklers				
Type (× 25.4 for mm)	standard orifice sprinkler ³ or large orifice sprinkler ³	ESFR ⁴	Large drop 0.64 inch ³	ESFR ⁴
Temperature rating	High	Ordinary	Ordinary	Ordinary
Spacing (sq. ft.) (× 0.093 for m ²)	100 Max.	80-100	80-100	80-100
Demand (× 40.75 for gpm/ft ² to L/min. per m ²) (× 6.89 for psi to kPa)	0.30 gpm/sq. ft. over 2,500 sq. ft.	12 heads at 50 psi	15 heads at 50 psi	12 heads at 50 psi
Hose stream demand (gpm) ⁵ (× 3.79 for L/min.)	500	250	500	250
Water-supply duration (hours)	2	1	2	1

¹Storage shall be in cartons.

²Shelf storage shall not exceed 8 feet (2438 mm).

³Conventional standard orifice sprinkler, large orifice sprinkler or large drop sprinklers having the faster thermal response characteristics of listed quick-response (QR) sprinklers shall not be used.

⁴ESFR heads shall not be used for shelf storage.

⁵For 2,000-square-foot (185.8 m²) or smaller Group H, Division 3 aerosol storage rooms, use 250 gallons per minute (946.3 L/min.).

TABLE 8803.1-B—LEVEL 3 AEROSOL PRODUCTS—ARRANGEMENT AND PROTECTION OF PALLETIZED AND SOLID-PILE STORAGE¹

Maximum ceiling height (feet) (? 304.8 for mm)	30	30	25	20
Maximum pile height (feet) (? 304.8 for mm)	5	15	15	10
Sprinklers Type (? 25.4 for mm)	standard orifice sprinkler ² or large orifice sprinkler ² or extra-large orifice	ESFR	ESFR	Large drop 0.64 inch ²
Temperature rating	High,	Ordinary	Ordinary	Ordinary
Spacing (sq. ft.) (? 0.0929 for m ²)	100 max.	80–100	80–100	80–100
Demand (? 40.75 for gpm/ft ² to L/min. per m ²) (? 6.895 for psi to kPa)	0.60 gpm/sq. ft. over 2,500 sq. ft.	12 heads at 75 psi	12 heads at 50 psi	15 heads at 75 psi
Hose stream demand (gpm) ³ (? 3.79 for L/min.)	500	250	250	500
Water-supply duration (hours)	2	1	1	2

¹Storage shall be in cartons.

²Conventional standard orifice sprinkler, large orifice sprinkler or large drop sprinklers having the faster thermal response characteristics of listed quick-response (QR) sprinklers shall not be used.

³For 2,000-square-foot (185.8 m²) or smaller Group H, Division 3 aerosol storage rooms, use 250 gallons per minute (947.5 L/min.).

TABLE 8803.1-C—LEVEL 2 AEROSOL PRODUCTS—ARRANGEMENT AND PROTECTION OF RACK STORAGE WITH ESFR SPRINKLERS¹

Maximum ceiling height (feet) (× 304.8 for mm)	30	25
Maximum storage height (feet) (× 304.8 for mm)	15	20
Sprinklers Type	ESFR	ESFR
Temperature rating	Ordinary	Ordinary
Spacing (sq. ft.) (× 0.093 for m ²)	80–100	80–100
Demand (× 6.89 for kPa)	12 heads at 50 psi	12 heads at 50 psi
Hose stream demand (gpm) (× 3.79 for L/min.)	250	250
Water-supply duration (hours)	1	1

¹Single and double racks only. Storage shall be in cartons. Solid shelves shall not be installed in racks.

TABLE 8803.1-D—LEVEL 3 AEROSOL PRODUCTS—ARRANGEMENT AND PROTECTION OF RACK STORAGE WITH ESFR SPRINKLERS¹

Maximum ceiling height (feet) (× 304.8 for mm)	30	25
Maximum storage height (feet) (× 304.8 for mm)	15	15
Sprinklers Type	ESFR	ESFR
Temperature rating	Ordinary	Ordinary
Spacing (sq. ft.) (× 0.093 for m ²)	80–100	80–100
Demand (× 6.89 for kPa)	12 heads at 75 psi	12 heads at 50 psi
Hose stream demand (gpm) (× 3.79 for L/min.)	250	250
Water-supply duration (hours)	1	1

¹Single and double racks only. Storage shall be in cartons. Solid shelves shall not be installed in racks.

TABLE 8803.1-E—LEVEL 2 AEROSOL PRODUCTS—ARRANGEMENT AND PROTECTION OF RACK STORAGE WITH SPRAY SPRINKLERS^{1,2}

Maximum clearance from top of storage to ceiling or barrier sprinklers	15 feet (4572 mm)
Ceiling sprinklers Type Temperature rating Spacing (sq. ft.) Demand	Large orifice sprinkler or extra-large orifice High-temperature sprinkler 100 max. (9.3 m ²) 0.30 gpm/sq. ft. (12.2 L/min. per m ²) over 2,500 sq. ft. (233 m ²)
In-rack sprinklers Type Temperature rating Spacing	Standard orifice sprinkler Ordinary-temperature sprinkler or less Sprinklers shall be located at a maximum spacing of 8 feet (2438 mm) on center. One line at each tier except top. Locate in longitudinal flue space for double-row racks. Sprinklers shall be located at least 2 feet (610 mm) from rack uprights. A minimum clearance of 6 inches (153 mm) shall be maintained between the sprinkler deflectors and the top of storage in every tier.
Demand	30 psi (208 kPa) minimum discharge pressure. Based on operation of hydraulically most remote: Eight sprinklers if one level only Six sprinklers each for two levels Six sprinklers on top three levels if three or more levels
Hose stream demand (gpm)	500 (1893 L/min.)
Water-supply duration (hours)	2

¹Storage shall be in cartons.

²Use design option 1 in Table 8803.1-F for racks with solid shelves.

TABLE 8803.1-F—LEVEL 2 AEROSOL PRODUCTS IN RACKS WITH SOLID SHELVES AND LEVEL 3 AEROSOL PRODUCTS ARRANGEMENT AND PROTECTION OF RACK STORAGE WITH SPRAY SPRINKLERS¹

OPTION	CEILING PROTECTION					IN-RACK PROTECTION		
	Clearance Storage to Sprinklers (feet)	Discharge Density (gpm/square feet)	Design Area (square feet)	Maximum Spacing (square feet)	Temp. (°F)	Orifice (inch)	Minimum Demand (psi)	Arrangement
	? 304.8 for mm	? 40.75 for L/min. per m ²	? 0.0929 for m ²		-32 ? 5/8 for °C	? 25.4 for mm	? 6.89 for kPa	
1	Less than or equal to 5	0.30	2,500	100	High-temperature sprinkler	Large orifice sprinkler or extra-large orifice	30	Ordinary-temperature sprinkler, standard orifice sprinkler or large orifice sprinkler, spaced on maximum of 8-foot (2438 mm) centers. Longitudinal flue sprinklers shall be provided at each tier except at the top of the rack and located a minimum of 2 feet (610 mm) from rack uprights. A minimum clearance of 6 inches (153 mm) shall be maintained between the sprinkler deflectors and the top of storage in every tier. Face sprinklers shall be provided at every tier and shall be located at a maximum spacing of 8 feet (2438 mm). Face sprinklers shall be located a maximum of 18 inches (457 mm) from the face of storage. Provide staggered face sprinklers on the opposite side of the rack. Based on the operation of the hydraulically most remote: A. eight sprinklers if one level. B. six sprinklers each tier if two levels. C. six sprinklers on top three levels if greater than or equal to three levels.
	Greater than 5 and less than or equal to 15 ²	0.60	1,500 to 2,500	100	High-temperature sprinkler	Large orifice sprinkler or extra-large orifice		
	Greater than 15 ³	0.30	2,500	100	High-temperature sprinkler	Large orifice sprinkler or extra-large orifice		

(Continued)

TABLE 8803.1-F—LEVEL 2 AEROSOL PRODUCTS IN RACKS WITH SOLID SHELVES AND LEVEL 3 AEROSOL PRODUCTS ARRANGEMENT AND PROTECTION OF RACK STORAGE WITH SPRAY SPRINKLERS¹—Continued

OPTION	CEILING PROTECTION					IN-RACK PROTECTION		
	Clearance Storage to Sprinklers (feet)	Discharge Density (gpm/square feet)	Design Area (square feet)	Maximum Spacing (square feet)	Temp. (°F)	Orifice (inch)	Minimum Demand (psi)	Arrangement
	? 304.8 for mm	? 40.75 for L/min. per m ²	? 0.0929 for m ²		-32 ? ² / ₃ for °C	? 25.4 for mm	? 6.89 for kPa	
2	Less than or equal to 15	0.60	2,500	100	High-temperature sprinkler	Large orifice sprinkler or extra-large orifice	30	<p>Ordinary-temperature sprinkler, standard orifice sprinkler or large orifice sprinkler, spaced on a maximum of 8-foot (2438 mm) centers. Longitudinal flue sprinklers shall be provided at each level except at the top of the rack and located a minimum of 2 feet (610 mm) from rack uprights. A minimum clearance of 6 inches (153 mm) shall be maintained between the sprinkler deflectors and the top of storage in every tier. When clearance exceeds 15 feet (4572 mm), install face sprinklers staggered vertically and horizontally on the face of each tier and on the opposite side of the rack.</p> <p>Based on the operation of the hydraulically most remote:</p> <p>A. eight sprinklers if one level.</p> <p>B. six sprinklers each tier if two levels.</p> <p>C. six sprinklers on top three levels if greater than or equal to three levels.</p>
	Greater than 15	0.60	2,500	100	High-temperature sprinkler	Large orifice sprinkler or extra-large orifice		

¹When solid shelves are not present, design options 1 and 2 are both acceptable. When solid shelves are present, design option 1 shall be used. For both options, a minimum water-supply duration of two hours and a combined interior and exterior hose stream demand of 500 gallons per minute (1893 L/min.) are required. Storage shall be in cartons.

²The design area shall be interpolated for the noted clearances.

³Provide a noncombustible barrier above the top tier of storage with face sprinklers below.

⁴For ESFR ceiling protection, see NFPA 30B. See Section 9003, Standard n.2.1.

PART VIII**STANDARDS****ARTICLE 90 — STANDARDS****SECTION 9001 — GENERAL**

9001.1 UFC Standards. The *Uniform Fire Code* standards referred to in various parts of this code, which are also listed in Section 9002 and published in Volume 2 of this code, are hereby declared to be part of this code and are referred to in this code as a "UFC standard." When this code refers to a standard in the appendix of Volume 2, the standard shall not apply unless specifically adopted.

9001.2 Standard of Duty. The standard of duty established for the recognized standards listed in Section 9003 is that the design, construction and quality of materials of buildings, structures, equipment, processes and methodologies be reasonably safe for life, limb, health, property and public welfare. See also Section 101.3.

9001.3 Recognized Standards. The standards listed in Section 9003 are recognized standards. Compliance with these recognized standards shall be prima facie evidence of compliance with the standard of duty set forth in Section 9001.2.

SECTION 9002 — UFC STANDARDS

UFC STD. AND SEC.	TITLE AND SOURCE
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ARTICLE 10

10-1 1002.1, 1005.2.7, 1102.5.2.3, 2403, 3209, 3407, 4502.8.2, 4503.7.1, 5201.9, 7901.5.3, 7902.5.1.2.

NFPA 10-Standards for Portable Fire Extinguishers 1998 Edition.

10-2 1001.4, 1006.2.9.1.4, 1006.2.12.2.3, 1006.3.1, 1006.3.3.5, 6313.3 and 6320.1

NFPA 72 - National Fire Alarm Code 1999 Edition
Installation, Maintenance and Use of Fire Protection Signaling Systems

10-3

NFPA 13 - Standard for Installation of Sprinkler Systems 1999 Edition.

10-4

NFPA 13 D - Standard for Installation of Sprinkler Systems in 1 & 2 Family Dwellings 1999 Edition.

10-5

NFPA 13 R - Standard for Installation of Sprinkler Systems in Residential Occupancies up to and including 4 stories in height 1999 Edition.

10-6

NFPA 14 - Standpipe and hose systems 2000 Edition.

ARTICLE 24

24-1

NFPA 407 - Standards for Aircraft Fuel Servicing 1996 Edition.

ARTICLE 52

52-1 5201.1, 5204.2 and 5204.10.2.3.5

NFPA 52 - Compressed Natural Gas (CNG) Vehicular Fuel Systems 1998 Edition.

ARTICLE 62

62-1 6201 and 6205.1

NFPA 86 - Standards for Ovens and Furnaces 1999 Edition.

ARTICLE 74

74-1 7404.2.3

NFPA 99 - Standard for Health Care Facilities 1999 Edition.

ARTICLE 79

79-1 7902.2.4.2 and 7902.2.8.3

NFPA 11 - Standard for Low-Expansion Foam 1998 Edition.

79-2 7902.1.16.4 and 7902.2.6.3.4

NFPA 15 - Standard for Water Spray Fixed Systems for Fire Protection 1996 Edition

79-3 209, Table 4703-A, 6307.4, 6319, 7401.5.2, 7902.1.3.2, 8001.4.3.3, 8004.1.7, 8004.1.15, 8004.2.2.2 and 8004.4.3

NFPA 704 - Standard System for the Identification of the Hazards of Materials for Emergency Response 1996 Edition.

79-4 7904.6.1

NFPA 385 - Standard for Tank Vehicles for Flammable and Combustible Liquids 2000 Edition.

79-5 7902.1.8.1.1 and 7902.5.11.2.4

NFPA 386 - Portable Shipping Tanks for Flammable and Combustible Liquids 1990 Edition.

79-6 7902.6.10

Interior Lining of Underground Storage Tanks

79-7 7902.1.8.2.1, 7902.1.8.2.7, 7902.1.9.5, 7902.1.9.7 and 7903.3.3

Testing Requirements for Protected Aboveground Tanks.

ARTICLE 80

- 80-1** 8003.8.1, 8003.8.2 and 8004.1.16
Storage, Dispensing and Use of Silane and its Mixtures.
- 80-2** 7401.1, 7501.1 and 8004.1.14
NFPA 50B – Liquefied Hydrogen Systems at Consumer Sites 1999 Edition.
- 80-3** 7501.1
NFPA 508 – Standard for Liquefied Hydrogen Systems at Consumer Sites 1999 Edition.
- 80-4** 7501.1
Inert Cryogenic Fluid Systems at Consumer Sites

ARTICLE 81

- 81-1** 8102.9, 8102.10, 8103.2 and 8803.2
NFPA – 230 – Standard for the Fire Protection of Storage 1999 Edition.
- 81-2** 7902.5.11.5.1, 7902.5.12.5.1, 8102.9, 8102.10, 8104.2, 8104.4 and 8803.2
NFPA 230 Standard for the Fire Protection of Storage 1999 Edition.
- 81-3** 8102.7
Mechanical Smoke-removal Systems.
- 81-4** 8101.1, 8104.2.3.1, 8104.2.3.2 and 8106.1
NFPA 230 - Standard for the Fire Protection of Storage 1999 Edition.

ARTICLE 82

- 82-1** 5201.3.2, 5203.5.1, 8201, 8203, 8206, 8208, 8211, 8212 and 8214
NFPA 58 - Liquefied Petroleum Gas Storage and Use 1998 Edition

ARTICLE 88

- 88-1** 8801
Classification of Aerosol Products.

APPENDIX

- A-III-C-1, A-III-C Section 1**
NFPA 25 - Standard for the Inspection, Testing and Maintenance of Water-based Fire-protection Systems 1992

SECTION 9003 — RECOGNIZED STANDARDS

- a.1 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS**
444 N. Capitol Street, Suite 225, Washington, DC 20001
a.1.1 Standard Specifications for Highway Bridges
- a.2. AMERICAN NATIONAL STANDARDS INSTITUTE**
11 W. 42nd, New York, NY 10036
ANSI STANDARDS

- a.2.1. ANSI A13.1 Scheme for the Identification of Piping Systems
- a.2.2. ANSI B31 Guide
- a.2.3. ANSI B31.1 Power Piping
- a.2.4. ANSI B31.2 Fuel Gas Piping
- a.2.5. ANSI B31.3 Chemical Plant and Petroleum Refinery Piping
- a.2.6. ANSI/ASME B31.4 Liquid Petroleum Transportation Piping System
- a.2.7. ANSI B31.5 Refrigeration Piping
- a.2.8. ANSI B31.5a Refrigeration Piping
- a.2.9. ANSI B31.8 Gas Transmission and Distribution Piping Systems
- a.2.10. ANSI/IEEE 484 Recommended Practice for Installations of Large-Lead Storage for Generating Stations and Substations.
- a.2.11. ANSI/IEEE 937 Recommended Practice for Installation and Maintenance of Lead-Acid Batteries for Photovoltaic (PV) Systems.
- a.3. AMERICAN PETROLEUM INSTITUTE**
1220 "L" Street, N.W., Washington, DC 20005
API STANDARDS
- a.3.1. 12-B Specification for Bolted Tanks for Storage of Production Liquids
- a.3.2. 12-D Specification for Field Large Welded Tanks for Storage of Production Liquids
- a.3.3. 12-F Specification for Shop Welded Tanks for Storage of Production Liquids
- a.3.4. 620 Recommended Rules for Design and Construction of Large Welded, Low Pressure Storage Tanks
- a.3.5. 650 Welded Steel Tanks for Oil Storage
- a.3.6. 651 Cathodic Protection of Aboveground Petroleum Storage Tanks
- a.3.7. 653 Tank Inspection, Repair, Alteration, and Reconstruction
- a.3.8. 1529 Standard for Aircraft Fuel Servicing Hose and Couplings
- a.3.9. 1604 Removal and Disposal of Used Underground Petroleum Storage Tanks, 1987 edition
- a.3.10. 1615 Installation of Underground Petroleum Storage Systems
- a.3.11. 1632 Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems
- a.3.12. 2000 Venting Atmospheric and Low Pressure Storage Tanks
- a.3.13. 2001 Fire Protection in Refineries
- a.3.14. 2003 Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents
- a.3.15. 2009 Safe Welding and Cutting Practices in Refineries, Gas Plants, and Petrochemical Plants
- a.3.16. 2015 Safe Entry and Cleaning of Petroleum Storage Tanks
- a.3.17. 2023 Guide for Safe Storage and Handling of Heated Petroleum: Derived Asphalt Products and Crude Oil Residue

- a.3.18. 2028 Flame Arrestors in Piping Systems
- a.3.19. 2201 Procedures for Welding or Hot Tapping on Equipment Containing Flammables
- a.3.20. 2350 Overfill Protection for Petroleum Storage Tanks
- a.4. AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
ASTM STANDARDS
 - a.4.1. ASTM A 395 Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures
 - a.4.2. ASTM D 5 Penetration of Bituminous Materials
 - a.4.3. ASTM D 56 Test Method for Flash Point by Tag Closed Tester
 - a.4.4. ASTM D 86 Standard Method of Test for Distillation of Petroleum Products
 - a.4.5. ASTM D 92 Test Method for Flash and Fire Points by Cleveland Open Cup
 - a.4.6. ASTM D 93 Test Method for Flash and Fire Points of Liquids by Pensky-Martins Closed
 - a.4.7. ASTM D 323 Test Method for Vapor Pressure of Petroleum Products (Reid Method)
 - a.4.8. ASTM D 3061 Tin-Plate Fabricated Aerosol Cans
 - a.4.9. ASTM D 3063 Pressure in Glass Aerosol Bottles
 - a.4.10. ASTM D 3064 Standard Terminology Relating to Aerosol Products
 - a.4.11. ASTM D 3073 Filling and Inspection of Glass Aerosol Containers
 - a.4.12. ASTM D 3278 Test Methods for Flash Point of Liquids by Setaflash Closed Cup
 - a.4.13. ASTM D 4021 Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks
 - a.4.14. ASTM E 681 Standard Test Method for Concentration Limits of Flammability of Chemicals
 - a.4.15. ASTM E 1354 Standard for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
 - a.4.16. ASTM E 1529 Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fire on Structural Members and Assemblies
- a.5. AMERICAN SOCIETY OF MECHANICAL ENGINEERS
345 East 47th Street, New York, NY 10017
ASME STANDARDS
 - a.5.1. ASME Boiler and Pressure Vessel Code
Section I. Power Boilers
Section VIII. Pressure Vessels, Division 1 or 2
- a.6. ASSOCIATION OF AMERICAN RAILROADS, Bureau of Explosives
1920 "L" Street, N.W., Washington, DC 20036
AAR CIRCULARS
 - a.6.1. 17-E Tank Car Loading Racks
- c.1 COMPRESSED GAS ASSOCIATION, INC.
1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4100
CGA PAMPHLETS
 - c.1.1. C-7 Guide to the Precautionary Labeling and Marking of Compressed Gas Containers
 - c.1.2. P-1 Safe Handling of Compressed Gases
 - c.1.3. Pressure Relief Device Standards—Part 1 Cylinders for Compressed Gases (8th Edition, 1994)
 - c.1.4. Pressure Relief Device Standards—Part 2 Cargo and Portable Tanks for Compressed Gases (6th Edition, 1995)
 - c.1.5. Pressure Relief Device Standards—Part 3 Stationary Storage Containers for Compressed Gases (5th Edition, 1995)
 - c.1.6. P-2.-1995 Transfilling of Liquid Oxygen Used for Respiration
- f.1. FACTORY MUTUAL ENGINEERING AND RESEARCH
1151 Boston-Providence Turnpike, Norwood, MA 02062
FACTORY MUTUAL DATA SHEETS AND APPROVAL STANDARDS
 - f.1.1. 8-9 Storage of Class I, II, III, IV and Plastic Commodities
 - f.1.2. 4430 Heat and Smoke Vents
- i.1. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA
345 East 47th Street, New York, NY 10017
 - i.1.1. IES Lighting Handbook
- i.2. INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS
5360 Workman Mill Road, Whittier, CA 90601
UNIFORM BUILDING CODE STANDARDS
 - i.2.1. 15-7 Automatic Smoke and Heat Vents
- n.1. NATIONAL ASSOCIATION OF CORROSION ENGINEERS
1440 South Creek Drive, Houston, TX 77084
RECOMMENDED PRACTICES
 - n.1.1. RP-01 Control of External Corrosion of Underground or Submerged Metallic Piping Systems
 - n.1.2. RP-02 Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems
- n.2. NATIONAL FIRE PROTECTION ASSOCIATION
Post Office Box 9101, Batterymarch Park, Quincy, MA 02269
NFFPA STANDARDS
 - n.2.1 30B Code for the Manufacture and Storage of Aerosol Products
 - n.2.2. 40 Storage and Handling of Cellulose Nitrate Motion Picture Film
 - n.2.3. 46 Recommended Safe Practices for Storage of Forest Products
 - n.2.4. 497A Classification of Class I Hazardous Locations for Electrical Installations.

- n.2.5. 59A Standard for the Production, Storage and Handling of Liquefied Natural Gas
- n.2.6. 505 Firesafety Standard for Powered Industrial Trucks (Forklifts)
- n.2.7. 701 Standard Methods of Fire Tests for Flame-resistant Textiles and Films
- n.2.8. 703 Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings for Building Materials
- n.2.9. 2001 Clean Agent Fire-extinguishing Systems
- n.2.10 92A Smoke Control Systems
- n.2.11. 92B Smoke Management Systems in Malls, Atria, and Large Areas
- n.2.12. 204 Smoke and Heat Venting
- n.2.13. 30 NFPA Flammable and Combustible Liquid Code
- n.3. NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, 4676 Columbia Pkwy, Cincinnati, OH 45226
 - n.3.1. NIOSH/OSHA Pocket Guide to Chemical Hazards
- s.1. STEEL TANK INSTITUTE
666 Dundee Road, Suite 705, Northbrook, IL 60062
 - s.1.1. Standard sti-P₃® Specification for Exterior Corrosion Protection of Underground Steel Storage Tanks
- u.1. UNDERWRITERS LABORATORIES INC.
333 Pfingsten Road, Northbrook, IL 60062
UL STANDARDS
 - u.1.1. UL 25 Meters for Flammable and Combustible Liquids and LP-Gas
 - u.1.2. UL 30 Metal Safety Cans
 - u.1.3. UL 58 Steel Underground Tanks for Flammable and Combustible Liquids
 - u.1.4. UL 79 Power-Operated Pumps for Petroleum Dispensing Products
 - u.1.5. UL 80 Steel Tanks for Oil-Burner Fuel
 - u.1.6. UL 87 Power-Operated Dispensing Devices for Petroleum Products
 - u.1.7. UL 142 Steel Aboveground Tanks for Flammable and Combustible Liquids
 - u.1.8. UL 147B Nonrefillable (Disposable) Type Metal Container Assemblies for Butane
 - u.1.9. UL 330 Hose and Hose Assemblies for Dispensing Flammable Liquids
 - u.1.10. UL 525 Flame Arresters
 - u.1.11. UL 567 Pipe Connectors for Petroleum Products and LP-Gas
 - u.1.12. UL 793 Automatically Operated Roof Vents for Smoke and Heat
 - u.1.13. UL 842 Valves for Flammable Fluids
 - u.1.14. UL 1313 Nonmetallic Safety Cans for Petroleum Products
 - u.1.15. UL 1316 Glass Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohol's, and Alcohol-Gasoline Mixtures
 - u.1.16. UL 1746 External Corrosion Protection Systems for Steel Underground Storage Tanks
 - u.1.17. UL 2085 Protected Aboveground Tanks for Flammable and Combustible Liquids
 - u.1.18. UL 2245 Outline of Investigation for Below-grade Vaults for Flammable Liquid Storage Tanks
 - u.1.19. UL 1975 Fire Tests for Foamed Plastics Used for Decorative Purposes
 - u.1.20. UL 2208 Solvent Distillation Units
 - u.1.21. UL 300 Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas.
 - u.1.22. 1275 Flammable Liquid Storage Cabinets.
- u.2. UNDERWRITERS LABORATORIES OF CANADA INC.
7 Crouse Road, Scarborough, Ontario, Canada M1R 3A9
ULC STANDARDS
 - u.2.1. ULC 603.1-M Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids
- u.3. UNITED STATES OF AMERICA REGULATIONS
Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402
CODE OF FEDERAL REGULATIONS
 - u.3.1. Title 29, Section 1910
 - u.3.2. Title 40, Parts 280 and 281
 - u.3.3. Title 49, Chapter 1 (DOT Regulations)

APPENDIX I-C

STAIRWAY IDENTIFICATION

(See UFC Section 1210.4)

SECTION 1 — SCOPE

Signs to provide information to the occupants and fire department personnel to minimize confusion during emergencies shall be in accordance with Appendix I-C.

SECTION 2 — GENERAL

Standardized signs shall be provided in new and existing buildings that are four or more stories in height. Such signs shall be installed in stairways to identify each stair landing and indicate the upper and lower termination of the stairway.

SECTION 3 — SIGN DETAILS

3.1 Size. Signs shall be a minimum 12 inches by 12 inches (305 mm by 305 mm).

3.2 Stairway Location. The stairway location, such as STAIR 1 or WEST STAIR, shall be placed at the top of the sign in 1 inch high (25.4 mm) block lettering with 1/4 inch (6.4 mm) stroke.

3.3 Upper Terminus. The stairway's upper terminus, such as ROOF ACCESS or NO ROOF ACCESS, shall be placed under the stairway identification in 1 inch high (25.4 mm) block lettering with 1/4 inch (6.4 mm) stroke.

3.4 Floor Level Number. The floor level number shall be placed in the middle of the sign in 5 inch high (127 mm) block lettering with 3/4 inch (19.1 mm) stroke. The mezzanine levels shall have the letter "M" preceding the floor number. Basement levels shall have the letter "B" preceding the floor number.

3.5 Lower Terminus. The lower and upper terminus of the stairway shall be placed at the bottom of the sign in 1-inch-high (25.4 mm) block lettering with 1/4 inch (6.4 mm) stroke.

3.6 Maintenance. Signs shall be maintained in an approved manner.

SECTION 4 — EXAMPLES

See Figures A-I-C-1 and A-I-C-2 for examples.

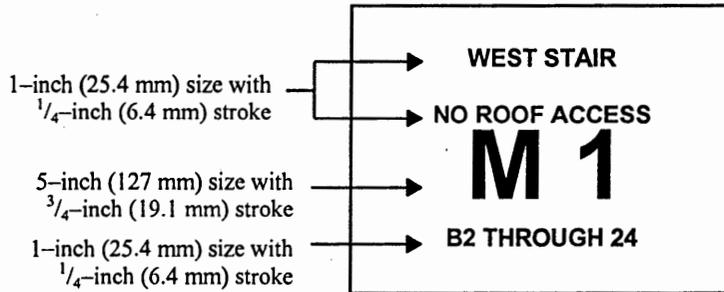


FIGURE A-I-C-1

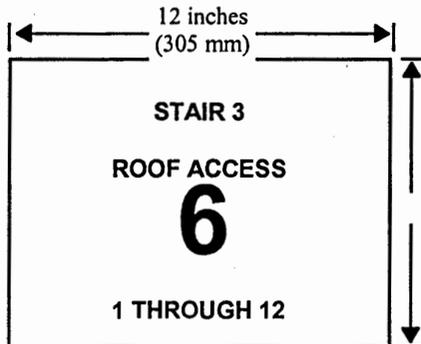


FIGURE A-I-C-2

APPENDIX I-D

FIRE PREVENTION GUIDELINES FOR HAUNTED HOUSES AND
SIMILAR TEMPORARY INSTALLATIONS

SECTION 1 — SCOPE

Haunted or fun houses or other similar installations set up for 90 days or less inside a structure not designed for this specific use shall comply with the following requirements.

SECTION 2 — PERMITS

When a permit is required to operate a haunted house or similar installation, it shall be obtained from the chief before the facility is opened to the public.

SECTION 3 — GENERAL REQUIREMENTS

Haunted houses and similar temporary installations shall comply with all the following:

1. There may be no dead-end corridors and there must be an obvious exit out of any maze every 50 feet (15 240 mm) of linear travel. All stairways must be illuminated at a level of at least 1 footcandle (10.8 lx)
2. Groups shall consist of not more than 20 persons. Each group of children age 12 and under must be accompanied and supervised by a staff person who is 18 years of age or older. The staff person must have in his/her possession an operable flashlight and be completely familiar with the facility.
3. There will be no smoking allowed at any time inside the occupancy as noted in Article 11.

4. All electrical installations shall meet the requirements of the Electrical code.

5. The chief shall be contacted for an inspection and the planning of an evacuation procedure prior to opening the facility to the public. The evacuation plan and occupancy shall be approved by the chief prior to public access.

6. The total number of occupants in the facility at any time shall be limited to a number determined by the chief.

7. No open-flame devices or temporary heaters are allowed in the occupancy.

8. Use of untreated combustible material is prohibited. All combustible material shall be treated or protected so that it is essentially rendered and maintained flameproof in a manner acceptable to the chief. This includes all harvest decorations such as cornstalks, dry branches and hay.

9. Blocking, locking or in any way impeding ready access to any marked or required exit is prohibited. All exit ways shall be kept clear of any obstructions or storage.

10. Sufficient numbers of fire extinguishers shall be provided to ensure that the maximum travel distance to any extinguisher does not exceed 50 feet (15 240 mm). The minimum acceptable rating (size) is 2A:10BC. All fire extinguishers shall be mounted in a conspicuous location. Staff members shall be instructed in the proper use of the extinguishers.